SAN DIEGO STATE UNIVERSITY

Georgia

SDSU 130-06-2018
06/13/2018

Magda Magradze
Chief Executive Officer
Millennium Challenge Account – Georgia

Dear Ms. Magradze,

Please find enclosed herewith the revised ABET Progress Report as of June 13, 2018, a deliverable for the provision of Degree Accreditation and Institutional Support Initiative for Science, Technology, Engineering, and Mathematics, as required per the contract.

Also attached is the invoice for ABET & ACS Pathways and Budget Development Report for May 2018 on Agreement #122 Amendment No. 2.

Please feel free to contact me if you have any questions.

Sincerely,

Halil Guven

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2018

SDSU Georgia

ABET / ACS REPORT

May 15, 2018

rev. June 13, 2018

SAN DIEGO STATE UNIVERSITY

Georgia

ABET PROCESS REPORT

The objectives of the ABET initiative of SDSU Georgia in CY4 were: To determine progress made by the partner universities since the SDSU Georgia ABET report completed in September 2017. The report provided recommendations that it may be possible to consider additional pathways, a “second track”, that do not bridge through the SDSU-delivered programs first, to facilitate the accreditation of programs at the partner universities. This report delineates and identifies the steps and timeline, for possible ABET accreditation of programs at partner universities. As a result of work done in CY4, SDSU-G identified potential second-track programs (2 second track programs at TSU and two at GTU) for ABET accreditation and started working with partner universities to prepare for accreditation. The TSU programs are well ahead of the GTU programs in developing and implementing the ABET required procedures and it is possible for the TSU programs to be ready for an ABET accreditation review visit in the fall of 2019. The earliest possible ABET review visit for GTU programs would be the fall of 2022. The ISU Computer Engineering and the Electrical engineering programs have approval for the transition of dual programs with SDSU-G and this method could allow the programs to be ready for an ABET review visit in the fall of 2022.

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1. Introduction

The country of Georgia has a critical shortage of science, technology, engineering and mathematics (STEM) professionals, educated to current international standards, graduating from their institutions of higher education. To address this problem, the Georgian government through the Millennium Challenge Account Georgia, with funding from the U.S. Millennium Challenge Corporation (MCC) contracted with SDSU to provide an American university education in Georgia focused on STEM disciplines that would improve human capital in the Georgian labor force.

SDSU will offer a variety of accredited degrees and certificates based upon recommendations of the government of Georgia, and regular needs assessments from local industry advisors. Initial degree offerings include the following ABET accredited programs: BS Computer Engineering; BS Electrical Engineering; BS Computer Science; and the BS Civil Engineering and BS Construction Engineering was added in September 2017. Initial offerings also include ACS-accredited BS Chemistry/Biochemistry program.

SDSU is approaching this project in partnership with Ilia State University, Tbilisi State University, and Georgian Technical University – the three premier public universities in Georgia – to provide accredited Bachelor's degrees in Georgia. Using the facilities of these three universities, SDSU-Georgia will focus on STEM education to train an advanced workforce to meet the growing needs of Georgia.

The second, equally important part of SDSU's contract is to collaborate with the partner universities to facilitate the accreditation of selective STEM BS programs at the partner institutions by ABET or ACS. Tbilisi State University, Ilia State University, and Georgian Technical University have executed preliminary Memoranda of Understanding (MOU) that reflect the institutions' mutual commitment to execute collaborative programs, develop courses and academic programs, joint scientific and technical research programs, exchanges of teaching and research personnel, student exchanges, and other mutually beneficial activities that enhance academic, research or technical progress at the universities.

This report summarizes the work accomplished in ABET related initiatives undertaken by SDSU at the partner universities during CY4.

2. Background

In February, 2013, the Millennium Challenge Account Georgia contracted with the ABET Foundation to provide consultancy services in order to assess STEM Programs and Design of Investment to Build Capacity for ABET Accreditation of Georgian universities. The purpose of the contract was to assess the capacity needs of relevant Georgian programs of study to deliver high quality accredited STEM bachelor degrees.

In December, 2013, the ABET Foundation provided information relative to the readiness of STEM programs at four Georgian universities for a review by ABET for possible program accreditation. Under preliminary evaluation by the ABET Foundation, Georgian degree programs presently exhibit: 1) A lack of consistent assessment of student learning and no mechanism to demonstrate continuous improvement process; 2) A lack of sufficient General Education; 3) Absence of an appropriate student guidance advisory that aids students with their curriculum and career matters; 4) The aging faculty members and their low involvement with professional organizations; 5) A lack of modern teaching and laboratory equipment in many discipline areas.

In response to the ABET Foundation's report, the core methodology proposed by SDSU to facilitate the accreditation of the partner institutions in the 45-month contract was to overlay SDSU's existing, and accredited, curricula onto the framework already provided by the partner institution.

The projection was that by the time the partner institution programs are eligible for consideration (e.g., have at least one graduate), nearly all of the first group of SDSU-Georgia programs will be transitioned to partner-institution instruction only, and thereby be appropriate to be submitted under a Request for Evaluation (RFE). It is projected that some programs could potentially be eligible and prepared to submit the RFE as soon as the end of CY5. Hence, by 2020 these programs should be in the process of applying for ABET or ACS accreditation. Some programs may have required a longer transition period depending on the speed of capacity building within that program.

3. Part One: ABET

In brief, ABET accreditation requires consideration of the programs according to several criteria, which have been specifically targeted by the proposed curricula, including:

Students – the qualifications of the students that are accepted and the monitoring of their performance against graduation requirements.

Program Educational Objectives – the mission of the program and its consistency with the institution's mission, and the achievement of these objectives. This criterion requires a working relationship with industry and an Industry Advisory Board in order to establish objectives and to assess the degree to which graduates achieve them in practice after graduation.

Program Outcomes – program outcomes must be established to achieve the program's educational objectives, and performance must be assessed against them. This assessment is made via metrics that are established with both direct and indirect assessments. Culminating experiences are also incorporated in the assessment strategy.

Continuous Improvement – Metrics must be monitored over time and used to improve the curriculum in general.

Curriculum – program curriculum is defined to achieve the program outcomes, and the details of this connection must be established and maintained.

Faculty – the, qualifications, size and the composition of the faculty to meet the needs of the curriculum.

Facilities – the physical resources (classrooms, labs, offices) available to support the needs of the program.

Support – financial resources to allow faculty development and support services of the Departments providing these programs.

At least every six years, programs submit a self-study document detailing the performance of the program against the criteria stated above. Subsequently, a visit is organized by ABET with a team of independent evaluators who make their own assessment of the accuracy of the self-study and make a recommendation for continued accreditation. The self-studies must include evidence of monitoring against all these criteria throughout the intervening period.

Accreditation at SDSU is an institutional priority with management responsibilities falling directly with the chairs of the relevant departments, overseen by the Deans of the colleges, and,

ultimately, by the Provost of the university. SDSU maintains accreditation in all the proposed degrees and is an active partner with ABET and ACS (the two accrediting organizations relevant to the first and second group of proposed degrees) in a process of continuous improvement not only to maintain accreditation, but also to improve student learning and student capacity to enter the job market in their chosen fields.

In all cases, learning assessments will be applied that are consistent with accreditation requirements and consist of an appropriate mix of direct and indirect assessments, with appropriate measurement tools. An example of direct assessment includes homework, examinations, class discussion and projects. Indirect Assessment includes qualitative student surveys that assist in adjusting the pace and focus of class lectures and homework, ensuring adequate progress and full compliance in learning outcomes for the students.

3.1 Objectives of CY4 ABET initiative

The SDSU Georgia ABET report completed in September 2016, provided recommendations that it may be possible to consider additional pathways, a "**second track**", to facilitate the accreditation of programs at the partner universities that do not bridge through the SDSU-delivered programs first. In this context, the **ABET First-track** is defined as the process of overlaying SDSU's existing, and accredited curricula onto the framework already provided by the partner institution. The **ABET Second-track** is defined as the accreditation of existing Georgian language STEM programs at the partner universities.

In September 2016 SDSU-G proposed to assist partner universities to obtain ABET Second-track accreditation for a few of their existing Georgian language STEM programs ("pilot programs"), for which they already have a number of graduates working in the industry. Based on a preliminary assessment of this idea during the CY2, SDSU-G determined that it may be possible to complete ABET Readiness report for the Second-track pilot programs by CY5, AY 2018-19, and potentially have ABET accreditation for pilot Georgian language programs in the AY 2020-21.

SDSU-G submitted an ABET report to the partner universities which provided a roadmap for the second-track ABET accreditation of the potential pilot programs. An action plan and a framework for the tasks to be undertaken during the remaining part of CY2, and the CY3 (8 months budget: Nov 1, 2016 - June 30, 2017) were also provided. A roadmap for ISU has not been proposed as ISU does not have any programs that can be piloted as second track. ISU is

commencing a new English language Computer Engineering program in Fall 2018, which may lend itself to the first-track accreditation

Table 1 shows the proposed first-track and second-track programs which can be prepared for ABET accreditation in each partner university. SDSU-G will pursue the ***first-track*** ABET accreditation as planned, or modified as appropriate, based on the outcome of the ABET-second track.

Table 1. First-track and Second-track ABET programs at partner universities

PU	First – track programs	Second – track pilot programs	Other (initiated by PU's for ABET review)
TSU	Computer Engineering	Computer Science Electrical Engineering	
GTU	Computer Engineering	Civil Engineering Electrical Engineering	Computer Science (BIG DATA) Biomedical Engineering
ISU	Computer Engineering Electrical Engineering Civil Engineering		Computer Science

During the Fall 2016 and Spring 2017 semesters, the ABET committees of GTU and TSU worked closely with SDSU-G, under the guidance of our ABET Officer, Dr. Hashemipour, to fulfill the first-track and second-track tasks. ISU ABET committee was activated in Fall 2017 semester to work on a first-track program in Computer Engineering.

The MCA-Georgia has signed a contract with the ABET Foundation, which provided ABET Accreditation Readiness Assessment of STEM Programs for the SDSU-G partner universities in September 2017.

Last comprehensive ABET progress report by SDSU-G was submitted in September, 2017. After their first visit in September 2017, ABET Foundation came for their second visit in April, 2018. This visit was a positive step towards ABET accreditation in partner universities.

Experts stated that TSU two programs can be the first ones from Georgia to apply for review in 2019. It was estimated that TSU Electrical Engineering program will require $274,445 USD and

Computer Science program $179,225 USD during the next five years. The numbers have already been communicated with the Ministry. TSU has managed to significantly improve the self-study report after the visit: curriculum changes have been approved by the Academic Council. Phase three renovations at TSU have also been completed.

There are currently four SDSU Georgia programs implemented in TSU: Chemistry/Biochemistry, Computer Engineering, Computer Science, and Electrical Engineering. Computer Science and Electrical Engineering TSU programs will cost $3,500 USD/year after ABET accreditation.

Georgian Technical University has established ABET committee (Board) and designated a position of an advisor to the Rector. GTU Civil Engineering and Electrical Engineering departments have prepared Preliminary Self-study Reports (PSSR) and received initial review from ABET Foundation. Due to extensive curriculum changes needed to make existing second-track programs at GTU compatible with ABET requirements, rather than revising the existing programs, GTU decided to offer two new ABET-compatible programs in Civil Engineering and in Electrical engineering in the Fall 2018. These new programs require an approval from EQE which is scheduled for June 2018 for an intake of first group of students in the Fall 2019. These programs will have a much smaller student quota, and higher NAEC thresholds in Math and Physics subject areas. This will allow for selection of students who are better suited for the more rigorous curricular requirements of an ABET accredited program. The first group of students to study with the new curriculum will be selected amidst the current students completing their freshman year in the Construction Engineering program at GTU. These students can commence the new program as sophomores in Fall 2018, through the mobility process. The earliest possible ABET review visit for GTU programs will be the Fall 2021. The self-study reports have been revised for the second visit of ABET Foundation in 2018.

There are currently five SDSU Georgia programs implemented in GTU: Chemistry/Biochemistry, Computer Engineering, Electrical Engineering, Civil Engineering, and Construction Engineering. GTU is currently studying the feasibility of the transitioning the four SDSU Georgia first track Engineering programs to GTU as well.

A new four-story campus to be equipped by SDSU Georgia for Ilia State University is being constructed. The building will include: Electrical Engineering, Computer Engineering, Civil Engineering laboratories and design space for students on the fourth floor. Necessity for budget allocation has been identified for the following categories:

- Technicians for Laboratory supervision and maintenance (one is already hired);

- Yearly maintenance and update of the Laboratories;
- Subscription for IEEE and ACM E-libraries;
- Time allocation for ABET Committee Members;
- Internationalization of the Programs;
- Programs Review and ABET Accreditation Costs.

There are currently two SDSU Georgia programs implemented in ISU; Computer Engineering, and Electrical Engineering. ISU programs intended for future ABET accreditation are as follows:

The ISU Computer Engineering and the Electrical engineering programs have approval to transition the dual programs with SDSU-G and this method could allow the programs to be ready for an ABET review visit in the Fall of 2022. The ISU Civil Engineering program intends to seek approval to transition the dual ISU/SDSU-G Civil Engineering program as a standalone program. The first possible date for this program to have an ABET review visit is Fall 2023.

3.2 Visit of the partner university representatives to SDSU for ABET Symposium

ABET Symposium organized by the Accreditation Board for Engineering and Technology Inc. for accreditation, assessment and global exchange of best practices in STEM education took place on April 12-13, 2018 in San Diego, California. The symposium was attended by 15 representatives of SDSU Georgia partner institutions. The purpose of the visit, besides attending the symposium, was for the group to attend trainings organized at SDSU main campus on the Accreditation Board for Engineering and Technology (ABET), and Western Association of Schools and Colleges (WASC) accreditation.

Delegation of partner universities, 15 representatives listed in arrived in San Diego on April 6, 2018 to attend training at SDSU home campus and ABET symposium.

Table 2. Partner university representatives attending ABET symposium in April 2018

Tbilisi State University (TSU) representatives	**Ilia State University representatives**	**Georgian Technical University (GTU) representatives**
Nikoloz Melkadze, ABET Facilitator *Giorgi Ghvedashvili*, Faculty of Electrical Engineering	*Giga Zedania*, Rector *Nino Zhvania*, Head of Quality Assurance Department	*Aleksander Zedelashvili*, ABET Facilitator *Lali Khuntsaria*, Faculty of Electrical

Tsismari Gavasheli, Faculty of Electrical Engineering *Manana Khachidze,* Faculty of Computer Engineering *Magda Tsintsadze*, Faculty of Computer Engineering	*Elene Zhuravliova*, Head of QA for the department of Natural Sciences and Engineering *Nana Dikhaminjia*, ABET Facilitator, Faculty of Computer Engineering *Giorgi Veshapidze*, Faculty of Computer Engineering	Engineering *Giorgi Gigineishvili*, Faculty of Electrical Engineering *Alexander Bagration-Davitashvili*, Faculty of Civil Engineering *Konstantine Bziava*, Faculty of Civil Engineering

On Monday, April 9, 2018 the delegation attended training at San Diego State University Engineering and Interdisciplinary Sciences Complex that was unveiled on the first day of the Spring 2018 semester. The training program agenda is given in Appendix 1. Prior to training, participants were given a chance to tour the campus spaces equipped with cutting-edge technology.

Within the first part of the SDSU training, each partner university made a separate presentation and shared their expectations regarding ABET accreditation process. Presentation of Tbilisi State University was facilitated by Nikoloz Melkadze, Ilia State University was represented by Nino Zhvania, and Georgian Technical University – by Alexander Zedelashvili and Alexander Bagration-Davitashvili. Presentations were followed by Q&A Session, emphasizing ABET expectations, along with the review of SDSU training and ABET Symposium program. Presentations of partner universities are given in Appendix 2.

Later on, the participants were split up into three groups for departmental breakout sessions.

Computer Science Breakout Session Group Members	Electrical/Computer Engineering Breakout Session Group Members	Civil/Construction Engineering Breakout Session Group Members
Majid Hashemipour, ABET expert *Nikoloz Melkadze*, TSU *Manana Khachidze*, TSU *Magda Tsintsadze*, TSU	*Lali Khuntsaria*, GTU *Giorgi Gigineishvili*, GTU *Giorgi Ghvedashvili*, TSU *Tsisana Gavasheli*, TSU *Nana Dikhaminjia*, ISU *Elene Zhuravliova*, ISU *Giorgi Veshapidze*, ISU	*Konstantine Bziava*, GTU *Alexander Bagration-Davitashvili*, GTU *Nana Zhvania*, ISU

Objectives of this was to share experience with partner university representatives, and to enable them to prepare short and long-term action items for ABET accreditation (self-study report

preparation, industry input, student materials, faculty course materials, faculty release time). Also, partner university representatives were given an opportunity to observe how SDSU handles program review process, and continuous improvement process, and storage and availability of documents.

The second day of SDSU Training commenced with a short discussion on Western Association of Schools and Colleges (WASC) accreditation and its requirements. The recent changes in ABET, like Criterion 3 and Criterion 5 were also covered during the second day of SDSU Training. Presentations by SDSU are given in Appendix 3 (Eugene Olevsky, Janusz Supernak, Stephen Schellenberg, Asfaw Beyene).

ABET Training at SDSU (presentation by Dr. Stephen Schellenberg)

Beyond the discussion sessions, participants were shown labs and facilities, ABET Rooms for Reviewers, break rooms, etc. In addition, Georgian delegation attended the spring 2018 SDSU Industrial Advisory Board of Civil, Construction and Environmental Engineering as observers. ABET training at SDSU.

Prior to ABET Symposium commencement, on April 11, 2018, SDSU-Georgia provided fifteen representatives of its partner universities with an opportunity to participate in the pre-Symposium Fundamentals of Program Assessment Workshop (FPAW). This workshop provided training to:

- Identify key elements of a functional assessment process.
- Clarify the similarities and differences between the course and program assessment.
- Make student outcomes measurable with the development of performance indicators.
- Understand the methods and measures to assess student outcomes.
- Develop rubrics to assist in evaluating student performance in achieving student outcomes.
- Understand the pros and cons of various data collection methods.
- Review an example of reporting results.

The workshop was designed to fully engage the faculty members and ABET facilitators in the creation of tools for continuous improvement and effective planning of process timelines. Partner universities plan to use the information received in the training for training of other faculty members at their respective institutions. Since the new national accreditation standards issued by EQE are very similar to the ABET continuous improvement logic, the ABET training on Fundamentals of Program Assessment proved very useful for partner universities. Agenda for the ABET pre-Symposium Workshop is attached as Appendix 4.

After the ABET Symposium, SDSU-Georgia conducted a short online survey to gather views of the partner university representatives on the ABET training visit to San Diego. The results of the survey are attached as Appendix 5.

3.3 Second visit of ABET Foundation, March, 2018

Upon return from ABET Symposium, ABET Foundation came for its second visit to Tbilisi in April, 2018. Second visit report is attached as Appendix 6. An analysis of the report findings will be given in the Overall Observations and Recommendations section.

3.4 ABET timeline by program

The projected dates for the likely first opportunity for ABET review of partner university programs are given in. As noted in the **Table 3** first opportunity for ABET review of programs is Computer Science and Electrical Engineering programs at TSU. The ABET process/ timeline for these two programs are given in **Table 4**.

Table 3. Likely first opportunity for ABET review of Partner University programs.

PARTNER UNIVERSITY	Program	ABET Track	Same as SDSU-Georgia Program	Approval for SDSU-Georgia Transition	Likely first opportunity for ABET review
TSU	Computer Engineering	First	Yes	Yes	Fall 2023
	Computer Science	Second	No	N/A	Fall 2019
	Electrical Engineering	Second	No	N/A	Fall 2019
ISU	Civil Engineering	First	Yes	Yes	Fall 2023
	Computer Engineering	First	Yes	Yes	Fall 2022
	Computer Science	N/A	N/A	N/A	Fall 2023
	Electrical Engineering	First	Yes	Yes	Fall 2022
GTU	Civil Engineering	Second	No	N/A	Fall 2022
	Construction Engineering	N/A	N/A	N/A	N/A
	Computer Engineering	First	Yes	Yes	Fall 2023
	Electrical Engineering	Second	No	N/A	Fall 2022
	Computer Science	N/A	N/A	N/A	Fall 2023

Table 4. TSU Second-track programs: Electrical Engineering and Computer Science (potential first opportunity for ABET visit in 2019)

ABET process/timeline	2018				2019				2020
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Visit of ABET Foundation Experts		X							
Readiness Review (RR) Report			X						
Submission of RR			X						
ABET response to RR				X					
Outcome Assessment Plan				X					
Continuous Improvement Plan					X				
Visit of ABET Foundation Experts					X				
Submit a request for Evaluation					X				
Preparation of final SSR						X			
Submission of SSR							X		
ABET Response and questions							X		
ABET On-site review								X	
Post-visit activity								X	
ABET Board approval									July 2020

Q1: January, February and March **Q2: April, May and Jun**

Q3: July, August and September **Q4: October, November and December**

Table 5. ISU First-track program: Computer Engineering (potential first opportunity for ABET visit in 2022)

ABET process/timeline	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Commencing of the program	X					
Outcome Assessment Plan		X				
Continuous Improvement Plan			X			
Outcome Assessment Plan				X		
Continuous Improvement Plan				X		
First Graduate of this program				X		
Preparation of final SSR				X		
ABET Response and questions					X	
ABET On-site review					X	
Post-visit activity					X	
ABET Board approval						July 2023

Table 6. TSU and GTU first-track program: Computer Engineering (potential first opportunity for ABET visit in 2023)

ABET process/timeline	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Commencing of the program	**X**					
Outcome Assessment Plan		**X**				
Continuous Improvement Plan			**x**			
Outcome Assessment Plan				**x**		
Continuous Improvement Plan					**x**	
First Graduate of this program					**x**	
Preparation of final SSR					**x**	
ABET Response and questions						**X**
ABET On-site review						**X**

Table 7. GTU's Second-track programs: Civil Engineering and Electrical Engineering programs (potential first opportunity for ABET visit in 2022)

ABET process/timeline	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Commencing of the program	X					
Outcome Assessment Plan		X				
Continuous Improvement Plan			X			
Outcome Assessment Plan				X		
Continuous Improvement Plan				X		
First Graduate of this program				X		
Preparation of final SSR				X		
ABET Response and questions					X	
ABET On-site review					X	
Post-visit activity					X	
ABET Board approval						July 2023

Table 8. GTU first-track program: Computer Science (BIG DATA -- potential first opportunity for ABET visit in 2023)

ABET process/timeline	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Commencing of the program	X					
Outcome Assessment Plan		X				
Continuous Improvement Plan			X			
Outcome Assessment Plan				X		
Continuous Improvement Plan					X	
First Graduate of this program					X	
Preparation of final SSR					X	
ABET Response and questions						X
ABET On-site review						X

3.5 Legislative and Policy related initiatives

During the CY4, SDSU-G did not perform any tasks related to any policy changes (at institutional level) or legislative changes at the national level (e.g., grading system changes in the Georgian Higher Education Law) that may be needed to implement ABET at the partner universities. This activity will be advanced in the next year.

3.6 Recommended Tasks for CY5

1. Outcome Assessment Plan:

Establishing:

i. Student outcomes consistent with ABET;
ii. Relationship between student outcomes and program educational objective;
iii. Assessment and Evaluation of Student Outcomes at Course Level;
iv. Assessment / Evaluation Tools for Capstone design reports;
v. Process for Attainment of Student Outcomes;
vi. Data collection at the end of every semester;
vii. Formation of an Industrial Advisory board for Computer Science program at TSU.

2. Continuous Improvement Plan:

i. Program Educational Objectives (PEO) Assessment Metrics and Cycle;
ii. Feedback Channels: Alumni, employer and faculty surveys;
iii. Preparation of Readiness Review (RR) Report, and the final Self Study Report (SSR).

3.7 Overall ABET Observations and Recommendations

The ABET accreditation process is a lengthy and cumbersome process and most of the work must be done by the faculty members of the programs. So far this work has been done mostly by one person in each program in the partner Universities. A key reason for this may be a lack of motivation and enthusiasm on the part of the faculty members. Partner university faculty and staff should have incentives to follow through ABET related initiatives. The process will require that all faculty members participate enthusiastically in the effort required. Currently, the ABET program coordinators are instructors in the SDSU-G programs, teaching students, and this is in

addition to their normal annual teaching loads at their home (partner) universities, which exceeds 20 hours of teaching load per week. SDSU-G recommends that a stipend be allocated to each program ABET coordinator at the partner universities and their teaching work load is reduced.

The faculty participation is significantly more evident at TSU than at GTU. Furthermore, the program at TSU began some work on developing assessment plans during the Fall 2017. This process needs to continue and likewise, be refined for improved assessing of Student Outcomes (Criterion 3) attainment. The results of these evaluations is systematically utilized as input for the continuous improvement during the spring 2018.

In addition, a clear system of direct and indirect assessment has to be in place. The Course Files should be systematically gathered and analyzed for midterms, quizzes and finals for improvement of the program delivery. For indirect assessment the students, faculty members, alumni and industry should be systematically surveyed to keep the curriculum relevant and industry oriented.

Finally, as outlined in Part 2, ABET accreditation is based on several criteria, which are:

1. Students
2. Program Educational Objectives
3. Program Outcomes
4. Continuous Improvement
5. Curriculum
6. Faculty
7. Facilities
8. Support

ABET Foundation's second visit report provides insights into improvements in each of the criterion listed above. As pointed out in the report, there are significant improvements in all areas since experts' visit in Fall 2017. However, attaining ABET accreditation is contingent upon demonstrating sufficient and adequate institutional support for the ABET programs. Specifically, Criterion #8, support and financial resources to allow faculty development and support services of the Departments providing ABET programs.

It should be noted that the following statements from the ABET Foundation report 2018 ABET Foundation report, May 2018, Task 1, page 4, clearly points to a total lack of support (with NO PROSPECTS!):

1) Assess whether institutional financial support is adequate and sustainable to support the vision and the capacity building needed in the STEM programs.

- As indicated in (a) above, **there is no reason to expect that institutional financial support would be adequate or sustainable to support the programs, given the low levels of government support for public universities and the low tuition that can be charged**. It appears that both GTU and TSU must rely on external sources of support to make the laboratory improvements that are needed, and there is no evidence that there will be sufficient continued support for maintaining and upgrading the facilities without continued external support.

2) Assess what resources are in place to ensure long-term operations and maintenance of infrastructure, facilities and equipment.

- This result is the same as that for (c) above. **Given that external support has been required for renovation, upgrading, and establishing new laboratories at three of the four programs reviewed, there is no basis for expecting that sufficient resources to ensure long-term operations will be available.**

The above two observations of the ABET Foundation will "short-circuit" the whole ABET initiative in the partner universities. Unless the above are properly addressed and support is insured, partner universities' Readiness Report (due October 1, 2018) CANNOT be submitted.

As these are factors EXTERNAL to SDSU's control, SDSU cannot help but bring these to the attention of MCA and MCC for immediate action. A letter of assurance from the MES to partner universities with specific support commitments may help alleviate above concerns. Such a letter may need to be included in the TSU ABET Readiness Reports (for CompSci and for EE) , when it is submitted to ABET before the deadline of October 1, 2018.

4. Part Two: ACS

4.1 ACS Certification at Tbilisi State University

Tbilisi State University – SDSU Georgia joint B.Sc. program in Chemistry/Biochemistry will have its first graduates in June, 2019. Certification of an independent standalone TSU Chemistry program by American Chemistry Society (ACS) requires TSU to demonstrate a "Track Record" in teaching B.S. in Chemistry / Biochemistry with SDSU B.S. Chemistry curriculum and labs, before ACS application or reviews starts. This can happen after all 4 years are taught by SDSU-G (May 2019 Graduation), and the TSU-SDSU program is transitioned to TSU. The prerequisites for the ACS Certification of TSU's standalone independent B.S. Chemistry program can be summarized as follows:

- All 4 years of the program taught by the Georgian colleagues (May 2021 graduation): All areas of chemistry taught in lectures and labs: Analytical, inorganic, organic, physical, etc.
- TSU demonstrates strong and continued support for:
    - Faculty/staff (experience, CV, hours/week taught, etc.);
    - Facilities and infrastructure development and maintenance, e.g., elevator;
    - Instrument upgrade, replacement, service contracts, and consumables.

American Chemical Society (ACS) Certification

Based on track record Reviewed annually and every 5 years:

- ✓ Faculty, Support teaching staff, lecturers, TAs (contact hours)
- ✓ Technical Support Staff, Stockroom
- ✓ Faculty development, ACS activities, memberships, diversity
- ✓ Courses taught (all areas: Analytical, Inorganic, Organic, Physical)
- ✓ Lab courses taught (all areas)
- ✓ Assessment and learning outcomes
- ✓ Undergraduate Research
- ✓ Equipment (acquisition and maintenance)
- ✓ Major instruments (all areas)

TSU Chemistry / Biochemistry program certification is planned for 2021. Currently, SDSU-G completed the 3rd year (junior year) of instruction in the TSU-SDSU Chemistry / Biochemistry program. SDSU-G continues building labs and having Georgian colleagues take over the teaching of the lectures and labs for the required courses. Each required course taught by the Georgian colleagues, and each major instrument (NMR, need elevator) installed is an ACS milestone.

4.2 TSU American Chemical Society (ACS) Committee

SDSUG started preparing for the independent standalone TSU Chemistry program certification on February 9, 2018 by asking a TSU rector's office to form a TSU ACS certification committee. TSU has formed a working committee for ACS certification. Members of TSU ACS Committee are as follows:

1. Aleksander Tsiskaridze – Deputy Rector of TSU
2. William Tong – Distinguished Professor of SDSU
3. Ramaz Khomeriki – Dean of Faculty of Exact and Natural Sciences
4. Nunu Ovsyannikova – Head of Administration of TSU
5. Dimitri Kordzaia – Dean of Medical Faculty
6. Ramaz Gakhokidze – Professor, Bio Organic Chemistry Department
7. Omar Mukbaniani – Professor, Macromolecular Chemistry Department
8. Shota Samsonia – Professor, Organic Chemistry Department
9. Giorgi Ghvedashvili – Head of Department of Scientific Research and Development
10. Bezhan Chankvetadze – Professor, Physical and Analytical Chemistry Depertment
11. Magda Alania – Associate Professor, Head of Quality Assurance Service
12. Giorgi Burjanadze – Assistant Professor, Faculty of Exact and Natural Sciences
13. Giorgi Jibuti – Assistant Professor, Faculty of Exact and Natural Sciences
14. Nino Kokiashvili – Senior Scientific Researcher, Faculty of Exact and Natural Sciences
15. Ana Goletiani – Invited Expert.

This committee was formed under the leadership of the provost, Alexander Tsiskaridze and is co-chaired by Professor William Tong. First meeting of the TSU ACS committee took place on May 3, 2018 at TSU. This kick-off meeting was also attended by SDSU-G Dean Halil Guven, SDSU College of Sciences Dean Walter Oechel, and Professor Douglas Grotjahn.

4.3 American Chemical Society (ACS) Student Chapter

SDSU-G formed an ACS student chapter and several of ACS student chapter officers attended ACS annual meetings with a grant from ACS headquarters, also supported by SDSU-G.

ACS Student Chapter visit to the National Meeting of ACS in New Orleans, LA

SDSU Georgia ACS Student Chapter members attended the National Meeting of ACS in New Orleans, LA this March. Ani Shalamberidze and Nini Shatirishvili were able to attend various workshops for career development, expositions of graduate schools and companies demonstrating brand new chemical equipment. They were able to attend the most recent research presentations from successful scientists, undergraduate poster sessions, meet other student chapters and ACS staff.

ACS Georgia student chapter is now getting ready for the next ACS National Meeting in Boston this August.

On May 4-5, ACS-SDSUG Student Chapter helped coordinate and sponsor a two-day International mini-Symposium at TSU.

On May 4-5, 2018, TSU held an international mini-symposium in partnership with Chemical Society of Georgia, American Chemical Society -SDSU Georgia Student Chapter.

Mini-symposium on "Bioactive Compounds, Antimicrobial & Biomedical Products and Materials for Protection of Human and Environment" was dedicated to the 100th Anniversary of Tbilisi State University.

4.4 Project Timeline for ACS Certification at TSU

Projected timeline for the ACS standalone accreditation at TSU is given below:

ACS Certification Timeline	2017				2018				2019				2021
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Establishment and recognition of the ACS Student Chapter	X	X											
Travel grant received from ACS HQ for SDSU-G Student Chapter			X										
SDSU-G ACS Student Chapter (Nino) attended ACS National Meeting in Washington			X										
Discussions with ACS HQ in Washington including a new ACS Chapter for the Region			X	X	X	X							
Travel grant received from ACS HQ for SDSU-G Student Chapter					X								
SDSU-G ACS Student Chapter Officers (Ani and Nino) attended ACS National Meeting in New Orleans					X								
Started ACS Committee with TSU leaders					X								
First ACS Student Chapter sponsored Symposium at TSU						X							
SDSU-G ACS Student Chapter Officers to attend ACS National Meeting in Boston							X						
NMR and other major instruments installed							X	X					
All 4 years of courses taught by SDSU-G									X	X			

All 4 Years of courses taught by Georgian colleagues **(2021**) and submit ACS Certification application													→

4.5 Overall ACS Observations and Recommendations

It is too early to make any substantive observations or recommendations on the potential ACS certification of B.S. Chemistry / Biochemistry program at TSU. However, the following topics can be noted:

1. Currently, TSU has several Chemistry departments organized under sub-disciplines (e.g., Organic, Inorganic, Analytical, Physical, etc.). TSU needs to set up a new English-Language Chemistry / Biochemistry Department to parallel SDSU's Chemistry / Biochemistry Department in San Diego. This new department will need to be ready to accept transitioning of the SDSU-G – TSU Chemistry / Biochemistry program. Subsequently, this new department will file an application to ACS for accreditation. This new department needs to be set up during CY5.
2. Maintenance policy needs to be established for the new laboratories. Currently, this is being discussed at the TSU's SDSU-G Program Transition Committee.
3. TSU needs to initiate hiring laboratory technicians.

Appendix 1

Agenda for ABET Training at SDSU and ABET Symposium (April 6- 16, 2018)

ABET TRAINING PARTICIPANTS

	First Name	Last Name	University	
1	Nikoloz	Melkadze	TSU	**ABET facilitator at TSU**
2	Giorgi	Ghvedashvili	TSU	Electrical Engineering
3	Tsismari	Gavasheli	TSU	Electrical Engineering
4	Manana	Khachidze	TSU	Computer Science
5	Magda	Tsintsadze	TSU	Computer Science
6	Aleksander	Zedelashvili	GTU	**ABET coordinator at GTU**
7	Lali	Khuntsaria	GTU	Electrical Engineering
8	Giorgi	Gigineishvili	GTU	Electrical Engineering
9	Alexander	Bagrationi-Davitashvili	GTU	Civil Engineering
10	Konstantine	Bziava	GTU	Civil Engineering
11	Giga	Zedania	ISU	**Rector**
12	Nino	Zhvania	ISU	Head of quality QA of University
13	Elene	Zhuravliova	ISU	Head of QA-Natural Sciences and Engineering
14	Nana	Dikhaminjia	ISU	Computer Engineering
15	Giorgi	Veshapidze	ISU	Computer Engineering
16	Tamar	Sanikidze	EQE	Director

April 6

- Leave Tbilisi for San Diego- Arrive in San Diego
- Flight Number : QR 256 - QATAR AIRWAYS
- **DEPARTURE**: TBILISI, GE (INTERNATIONAL) 06 APR 03:10
- **ARRIVAL**: DOHA, QA (HAMAD INTERNATIONAL) 06 APR 05:15
- **DEPARTURE**: DOHA, QA (HAMAD INTERNATIONAL) 06 APR 07:55
- **ARRIVAL**: LOS ANGELES, CA (LOS ANGELES INTL), TERMINAL B - 06 APR 14:00
- **Transportation from LAX to San Diego by bus ETA in San Diego 18:00 pm approximately**

  (meet the bus outside in Arrivals Area – coordinator Nick Melkadze)

- Accommodation Place: **Marriott Mission Valley**: _____

April 7 – 8

Weekend and orientation program in San Diego

- **April 7** - Free day
- **April 8** -Tour of Temecula Wine Country

  9:30 am Meeting in the Lobby

  5:30 pm Return

  5:30 pm -7:00 pm Rest in the Hotel

  7:00 pm Meet in the Lobby to travel to Easter Dinner

  7:30 pm Dinner Fogo de Chão Brazilian Steakhouse

ABET Training at SDSU, April 9 and 10

(Final agenda)

ABET Training at SDSU, April 9

Monday, April 9, E203E (Engineering building)		**Presenters**
7:00 – 7:30	Breakfast	Ismael, organizing
8:00 - 8:30	Welcome and Introductions	(Guven/ Beyene / Ismael)
8:30 – 9:30	Brief speeches by SDSU Deans (Olevsky, Oechel, Bouchard), Dept. Chairs and key faculty	C. Mi, J. Supernak, J.A. Lane, B. Tong, L. Tummala
9:30 – 10:00	Presentation by Georgian Technical University (ABET expectations)	Aleksander Zedelashvili and Alexander Bagrationi-Davitashvili
10:00 – 10:30	Presentation by Ilia State University (ABET expectations)	Nino Zvania
10:30 – 11:00	Presentation by Tbilisi State University (ABET expectations)	Nikoloz Melkadze
11:00 – 11:30	Review of Training Program at SDSU and ABET Symposium program	Halil
11:30 – 12:00	Discussion and Q & A, emphasis on **expectations**	Hal
12:00 – 13:30	Lunch, Day Quad, EIS complex	Ismael, organizing
Breakout for departmental sessions		

Rooms: EIS-104, EIS-220, and EIS-203 (reserved)		
13:30 – 15:00	Preparation for ABET as long- and short-term action items: • Self-study report • Industry input • Student materials • Faculty course materials • Faculty Release time	Computer Science, (Jo Ann) EIS-104
15:00 – 16:30	Storage and availability of documents: • pre-reviews by other department chairs or internal experts	Electrical and Computer Engineering, (Lal) EIS-220
16:30 – 17:00	The review process: • Venues: Rooms for Reviewers, break rooms, etc., • Understanding how reports are reviewed.	Civil, Construction and Environmental Engineering (Janusz) EIS-203
17:00 – 18:00	Continuous improvement process: • Student works, • Assessment vs grading, • **CAPSTONE course design.**	

Computer Science Breakout Session Group Members (Room EIS-104)
Majid Hashemipour
Nikoloz Melkadze
Manana Khachidze
Magda Tsintsadze

Civil/Construction Engineering Breakout Session Group Members (Room EIS-203)
Konstantine Bziava
Alexander Bagration-Davitashvili Nana Zhvania

EE/Comp. Engineering Breakout Session Group Members (Room EIS-220)
Lali Khuntsaria
Giorgi Gigineishvili
Giorgi Ghvedashvili
Tsisana Gavasheli
Nana Dikhaminjia
Elene Zhuravliova
Giorgi Veshapidze

April 10 (E203E)

8:00 – 8:30	Breakfast	Ismael, organizing
8:30 – 9:30	Deans on College level ABET involvement	Eugene, Cathie, Norma
9:30 - 10:00	Discussion	
10:00 – 12:00	Undergraduate Studies about WASC accreditation / requirements	Stephen Schellenberg
12:00 - 13:30	Lunch (Provost, Deans, Department Chairs, etc.); Faculty-Staff club	Ismael, reservation
13:30 – 15:00	Tour of labs and facilities, ABET Rooms for Reviewers, break rooms, etc.	Lal, Janusz, Jo Ann
15:00 – 16:00	CCEE faculty with the Georgia faculty, recent changes in ABET: Criterion 3 and Criterion 5.	Janusz
16:00 – 17:30	Meeting with Industrial Advisory Board of Civil, Construction and Environmental Engineering as observers.	Janusz

April 11

- 8:30 am -16:30 pm – Fundamentals of Program Assessment Workshop
- 16:30 pm Meeting with Joe Turner (after the Workshop at the Grand Hyatt Hotel Lobby).

April 12

- ABET Symposium: Manchester Grand Hyatt Hotel, 1 Market Pl, San Diego 92101.

Thursday, April 12, 2018	
7:00am-2:00pm	Registration Open
7:00am-8:30am	Breakfast
8:30am-9:30am	Opening Plenary
9:00am-7:00pm	Self-Study Report Room Open
9:30am-10:00am	Break
10:00am-11:00am	Concurrent Breakout Sessions
11:15am-12:15am	Concurrent Breakout Sessions
12:15pm-1:30pm	Lunch
1:30pm-2:30pm	Concurrent Breakout Sessions
2:30pm-3:00pm	Break

3:00pm-4:00pm	Concurrent Breakout Sessions
4:15pm-5:00pm	Fireside Chat
5:00pm- 6:30pm	**ABET Symposium Light Reception (at Grand Hyatt)**

April 13

- ABET Symposium: Manchester Grand Hyatt Hotel, 1 Market Pl, San Diego 92101.

Friday, April 13, 2018	
7:00am-12:00pm	Registration Open
7:30am-8:30am	Breakfast
8:30am-9:30am	Closing Plenary
9:00am-5:00pm	Self-Study Report Room Open
9:30am-10:00am	Break
10:00am-11:00am	Concurrent Breakout Session
11:15am-12:15pm	Concurrent Breakout Session
12:15pm-1:45pm	Lunch
1:45pm-2:45pm	Concurrent Breakout Sessions
2:45pm-3:15pm	Networking Break
3:15pm-4:30pm	Town Halls
6:00pm-8:00pm	Farewell Reception

April 14

- Participation in post-Symposium Workshops
- **8:30am-4:30pm** Fundamentals Program Assessment (Tamar Sanikidze, Giga Zedania, Nino Zhvania)

April 15

- DEPARTURE: SAN DIEGO, CA (INTERNATIONAL), TERMINAL 2 15 APR 11:18
- ARRIVAL: LOS ANGELES, CA (LOS ANGELES INTL) 15 APR 12:27
- DEPARTURE: LOS ANGELES, CA (LOS ANGELES INTL), TERMINAL B 15 APR 15:45
- ARRIVAL: DOHA, QA (HAMAD INTERNATIONAL) 16 APR 17:40
- DEPARTURE: DOHA, QA (HAMAD INTERNATIONAL) 16 APR 20:05
- ARRIVAL: TBILISI, GE (INTERNATIONAL) 17 APR 00:20

APPENDIX 2.

Presentations of Partner Universities at SDSU-Expectations

Georgian Technical University

Bachelor's CIVE, CONE, EE ABET Programs

Strategic Plan for the Program Development

Tbilisi, 2018

http://gtu.ge/Eng/Info/Symbolics.php

Partners

- *MCC*
- *MCA Georgia*
- *ABET consultants*
- *San Diego State University Georgia*

Goal - Prepare Bachelor's Program in Civ.Eng and EE.Eng for ABET Accreditatio

- ***Step I***

Create Georgian Language CIVE, CONE, EE Programs meeting the new requirements of Georgian Accreditation Center and get Accreditation for 2018/19 acad. years.

- ***Step II***

Adapt the student learning outcomes to the (new) ABET criteria and reorganize programs for ABET accreditation.

Learning Outcomes

	ABET criteria
1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
4	An ability to communicate effectively with a range of audiences
5	Aan ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
6	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
7	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

ABET criteria

is more detailed and precise, provides more confidence ……

Existing criteria

is more blurry ……

From existing to new programs

- *Civil Engineering to be divided into two – Civil Engineering and Construction Engineering*
- *The existing program - "Power/Energy and Telecommunication" becomes "Electrical Engineering" program.*

Implementation of the plan

- *70-100 students (from each - Civil Engineering(CIVE + CONE and Energy and Telecommunication) will be selected from the pool of second grade (from average – 400-500 students in each currently) and will be transferred through internal mobility to new, reorganized CIVE, CONE and EE program, they will continue as ABET accredited programs' students in 2018-2019 academic year i.e. - second academic year.*

Implementation of the plan

- *The Faculties will provide special academic course plans for the students that would have any difference in scores after comparing of curriculums (any costs related to these courses will be covered by the faculties).*

- *The Faculties are going to preliminary SSR and other supplementary Documents for ABET accreditation.*

Required materials are in process

- *Preliminary Self-Study report*
- *Curriculum, Syllable*
- *Human and Material resources*
- *Examination papers*
- *Capstone projects*
- *Assessment materials*

Budget ??, on EE base

- Sources of income …Could be two ……..? :
  funding from "Millennium" and income generated by the program
- "Millennium" ends its program in 2019……ABET accredited program fee - GEL 7,500 – still questionable, ability to pay…?
- Assumption I – EE Income of the first academic year - GEL 251,700 / 100,000 US $ (1 US $ = GEL 2.50) … accdg. to ABET report - 298,000 US $ is required for labs., etc. How/where to extract the estimated remaining cost for the first grade? Should it be transferred to the 2nd and 3rd years? How to bring it all in accordance with the ABET accreditation requirements.
- Assumption II - ABET accredited EE program income (four years) is - GEL 1,006,800 / 409,000 US $. …298,000 US $ is needed for labs., then only 111,000 US $ is remaining for to cover the rest - four year charges …..in ABET report it measured as - 131,000 US $.
- the equation does not converge
- Suggestions?

Thanks for the attention &

Question?

Ilia State University

NINO ZHVANIA

HEAD, QUALITY ASSURANCE OFFICE

SAN DIEGO

2018

About Ilia State University

Established in 2006

Two schools and two faculties
- School of Business
- School of Law
- Faculty of Arts and Sciences
- Faculty of Natural Sciences and Engineering

Number of students: 16,000

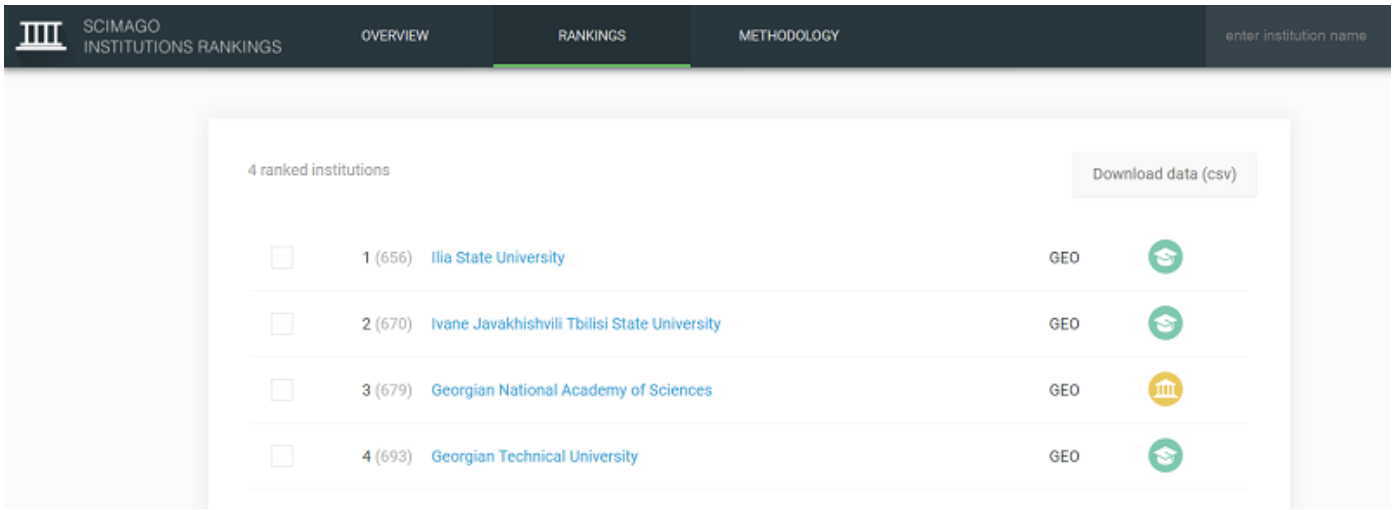
Number of Research Institutes: 18

Most recently:

The first university in Georgia to issues a joint degree diploma within ERSMUS + framework (the University of Glasgow & Tartu University)

Double Degree tracks with the Gottingen University for PhD students in partnership with the Volkswagen Foundation.

Ilia State University Research Ranking



Curricula at Faculty of Natural Sciences and Engineering

Bachelor Programs:
1. Mathematics
2. Natural Sciences (Physics, Biology, Ecology)
3. Earth Sciences (Geography and GIS, Geology, Geophysics)
4. Architecture
5. Computer Engineering (Georgian and English)

Doctoral Programs (PhD):
1. Life Sciences
2. Cellular Neuroscience
3. Earth Sciences
4. Mathematics
5. Physics and Astronomy
6. Medicine

Master Programs:
1. Physics and Astronomy
2. New Materials for Nanoelectronics and Nanoengineering
3. Applied Genetics (Georgian and English)
4. Earth Sciences (Geology, Geophysics, Geography and GIS)
5. Life Sciences (Ecology, Molecular Biosciences, Biopharmacy, Neurosciences)
6. Natural Resources and Forest Science
7. Mineral resources, Energy Management and Sustainable Development
8. Basic Paradigms of Modern Mathematics and their Application
9. Food Science
10. Computer Engineering
11. Modern Architecture and Sustainable Development

Research Centers and Institutes

Institute of Chemical Biology

Institute of Ecology

Abastumani National Astrophysical Observatory

Institute of Fundamental and Interdisciplinary Mathematical Research

Institute of Theoretical Physics

Institute of Biophysics

Institute of Botanics

Institute of Earth Sciences and National Center of Seismic Monitoring

Institute of Zoology

Laboratory of Sleep-Wakefulness Studies

Institute of Medicine

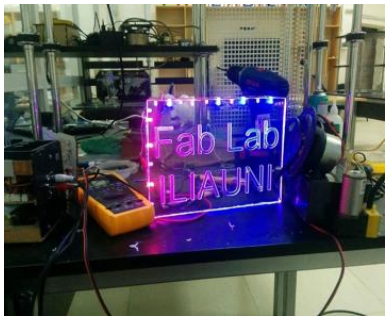
Optically Trapped Quantum Matter Research Center

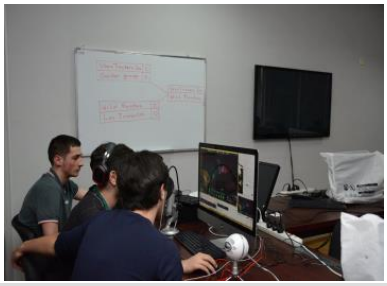
Fieldwork Facilities

- Abastumani Astrophysical Observatory
- Dedophlistskaro
- Kazbegi
- Grigoleti
- Research vessel for marine studies

Student Project Centers

- FABLAB
- GAMELAB
- ZOOMOUT pre-accelerator





New Academic Building for Engineering Programs

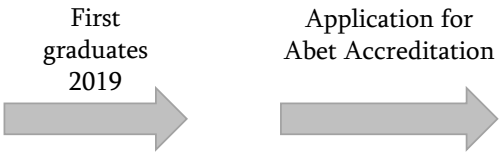
- Computer Engineering Lab
- Electrical Engineering Lab
- Civil Engineering Lab

Programs in partnerships with SDSU

Computer Engineering

Electrical Engineering

Civil Engineering (in development)



ABET Committee
ISU-SDSD Georgia Program Transition Committee

Needs towards ABET accreditation

Program peer review

Professional development of academic staff

Assessment of the preliminary self-study report

Further support for the development of civil engineering program in partnership with the SDSU

Further promotion of internationalization efforts in cooperation with SDSU

Enhancement of the relationship with industrial partners

Participation in the capstone project assessment board

Iv. Javakhishvili Tbilisi State University – Expectations from ABET Symposium 2018

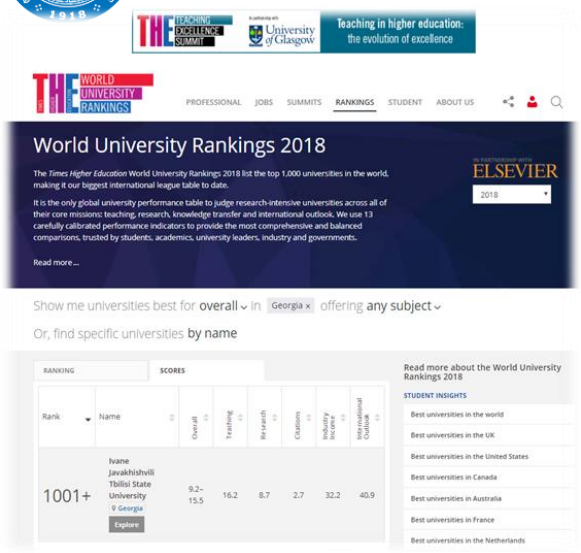
San Diego California – April 9, 2018

Ivane Javakhishvili Tbilisi State University
ივანე ჯავახიშვილის სახელობის თბილისის სახელმწიფო უნივერსიტეტი

TSU – Brief Overview

Since foundation in 1918, TSU, the first university in Georgia and throughout the Caucasus region illustrates scientific development in the country.

For the decades, the world-known scientific-research schools have been established on the bases of TSU led by famous Georgian scholars - Ivane Javakhishvili, Akaki Shanidze, Elefter Andronikashvili, Niko Muskhelishvili, Ivane Beritashvili and many others. As a result, TSU has become the world famous research center in varied fields of study.



TSU is the only University in Georgia, as well as in whole Caucasus Region, which appears in the Times Higher Education World University Rankings.

Ivane Javakhishvili Tbilisi State University
ივანე ჯავახიშვილის სახელობის თბილისის სახელმწიფო უნივერსიტეტი

TSU – Brief Overview

The close cooperation and collaboration are established with many scientific groups and top-ranking Universities of all over the world.

Alumni of Tbilisi State University are invited at leading universities and scientific centers in order to conduct the joint investigations as well as to deliver lectures.

Research projects at TSU are financed by National science and various international funds like NATO SfP program, CRDF, ISTC, INTAS, SNF, EC Frame Programs, GTZ, FZJ and etc.

The TSU researchers publish over 800 scientific publications annually (among them in high-rating scientific journals); more than 200 scientific projects are carried out; annually approximately 40-50 doctoral theses are defended.

TSU – ABET Facts and Expectations

•Two Georgian Language programs undergoing ABET accreditation. Electrical and Electronics Engineering and Computer Science.

•First essential review was done in 2013;

•Expert visit from abet foundation was in September 2017;

•**Task 1** and **Task 2** reports. Possible Accreditation review in 2019;

•Expert visit in April-May 2018.

Ivane Javakhishvili Tbilisi State University
ივანე ჯავახიშვილის სახელობის თბილისის სახელმწიფო უნივერსიტეტი

TSU – Expectations from ABET Symposium 2018

•Fundamental knowledge of the process and logic behind every section in SSR;

•Fulfilling ABET criteria includes creating and maintaining modern facilities;

•International Student recruitment for ABET accredited programs;

•Ambitious plan after receiving the accreditation;

•Developing a training package for other programs in TSU and helping them get accredited

Department of Computer Science– Brief History

- Department of Computer Science, the former Faculty of Exact and Natural Sciences, is a successor to the Faculty of Cybernetics founded in 1963 in scope of five year program "Cybernetics".
- The name was changed from of faculty to the name, Faculty of Applied Mathematics and Computer Sciences in 1993.
- After the reform conducted in 2006, the Faculties were merged. The Faculty of Mathematics and Computer Science was merged with 6 other faculties and now the program is located in a Department of Computer Science under the Faculty of Exact and Natural Science.

Ivane Javakhishvili Tbilisi State University
ივანე ჯავახიშვილის სახელობის თბილისის სახელმწიფო უნივერსიტეტი

Computer Science– Staff and Expectations

- Teaching staff: 4 Professors, 12 Associated Professor; 12 Assistant Professors
- Number of undergraduate students: approx. 500; graduate students: 100 Master Students and 10 Ph.D. students
- Most of the staff are ACM members

Expectations from ABET Symposium 2018

- Assessment procedure and SSR writing experience

2018 4

Electrical and Electronics Engineering – Expectations from ABET Symposium 2018

·Department of Electrical and Electronics Engineering was founded in 2007.

·Before starting of Bologna process, it existed on the basis of TSU Laboratory of Applied Electrodynamics (LAE) and as set of chairs of Radio-physics, Semiconductor physics; Solid-state physics; Radio-technics within the Physics Department.

Ivane Javakhishvili Tbilisi State University
ივანე ჯავახიშვილის სახელობის თბილისის სახელმწიფო უნივერსიტეტი

Electrical and Electronics Engineering – Expectations from ABET Symposium 2018

- Teaching staff: 2 Professors, 1 Associated Professor; 2 Assistant Professors
- Scientific staff: 12 scientists and engineers
- Number of undergraduate students: approx. 77 (app. 110 are expected for the spring semester); graduate students: 10 Ph.D. students
- Most of the staff are IEEE members

IEEE
Advancing Technology for Humanity

2018

Thank You for Attention ☺

APPENDIX 3.

Presentations by SDSU for ABET Training of Partner Universities

SAN DIEGO STATE UNIVERSITY

College of Engineering

Dr. Eugene Olevsky,
Interim Dean

Our Vision and Mission Statements

San Diego State University

- **Vision**

  - The SDSU College of Engineering educates a diverse group of students to become engineering innovators and contributes to the technical knowledge of society at large.

Adopted by the College of Engineering Faculty in Fall 2010

- **Mission**

  - The SDSU College of Engineering is dedicated to innovative education, research, and dissemination of knowledge. We instill critical thinking in our graduates to
    - recognize human and societal needs;
    - design innovative, sustainable engineering solutions;
    - embrace an international perspective; and
    - create value through entrepreneurial efforts.

Adopted by the College of Engineering Faculty in Fall 2010

About The College of Engineering

San Diego State University

- Undergraduate Enrollment, Fall 2017: 3956 (18% W)
- Graduate Enrollment, Fall 2017: 314 (28% W)
- Total Degrees Granted, 2016-17: 685 (19% W)
- Undergraduate Degree Programs: 8
- Graduate Degree Programs: 13

Bachelor's Degrees Offered

San Diego State University

- Aerospace Engineering
- Civil Engineering
- Computer Engineering
- Construction Engineering
- Electrical Engineering
- Environmental Engineering
- Mechanical Engineering
- Mechanical Engineering with Bioengineering Emphasis

ABET Criteria

1. Students,
2. Program Educational Objectives,
3. Student Outcomes,
4. Continuous Improvement,
5. Curriculum,
6. Faculty,
7. Facilities, and
8. Institutional Support.

All ABET - Accredited

Master's Degrees Offered

San Diego State University

Master of Science:

- Aerospace Engineering
- Bioengineering
- Civil Engineering
- Electrical Engineering
- Computer Engineering
- Environmental Engineering
- Mechanical Engineering
- Structural Engineering

Also in collaboration with College of Business:

- Master of Engineering

Ph.D. Degrees Offered

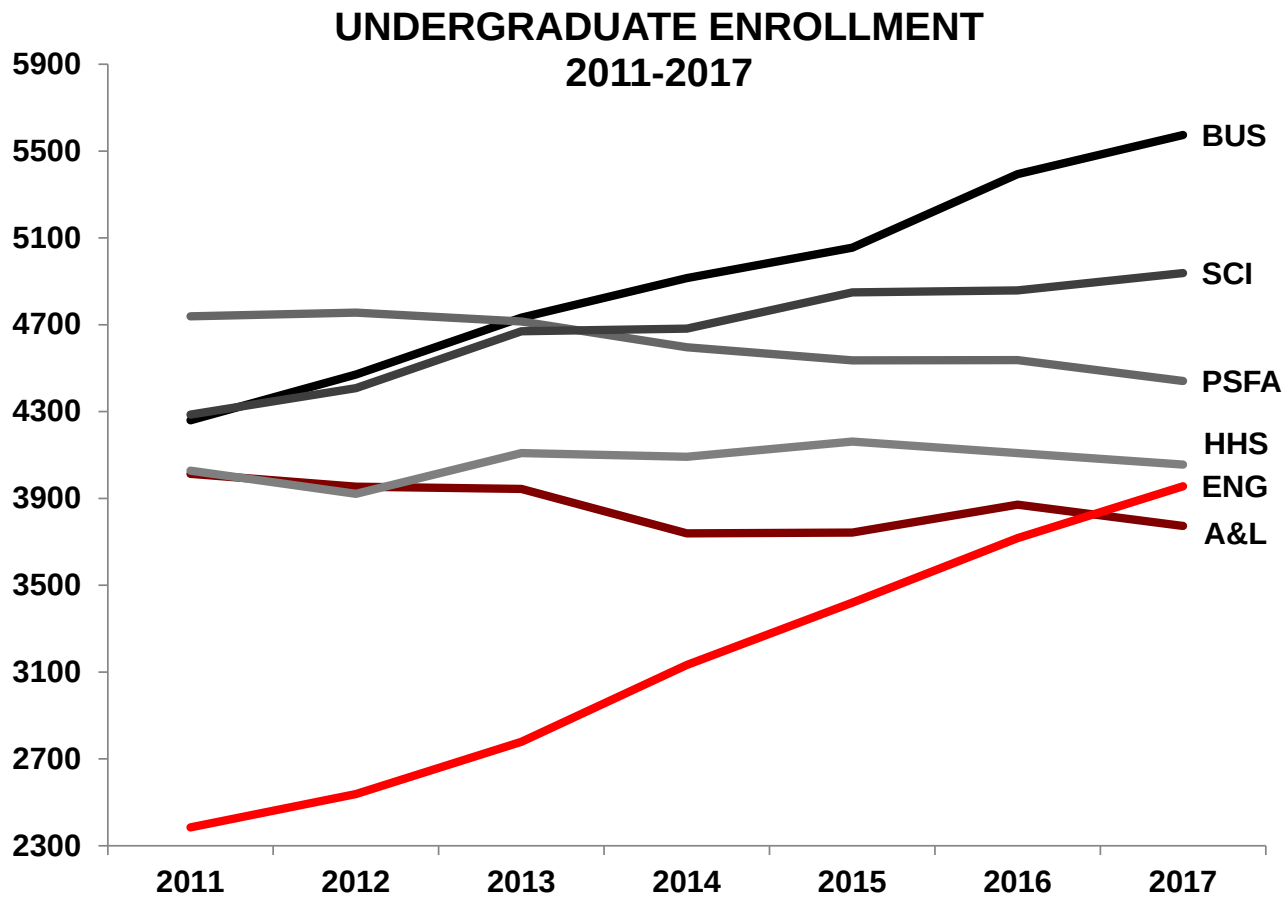
San Diego State University

Joint Doctoral Program with UCSD

- ✧ Aerospace & Mechanical Engineering
- ✧ Bioengineering
- ✧ Electrical & Computer Engineering
- ✧ Structural Engineering

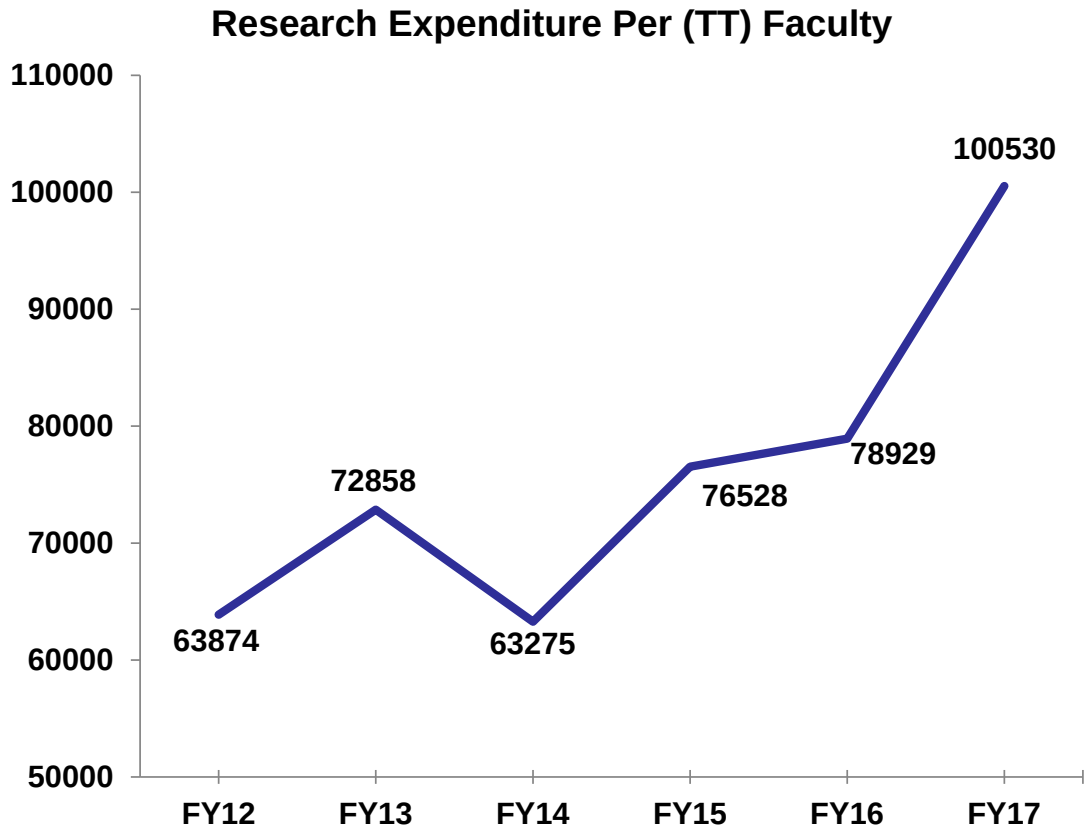
Enrollment Trend in SDSU Colleges

San Diego State University



Research Expenditures

San Diego State University

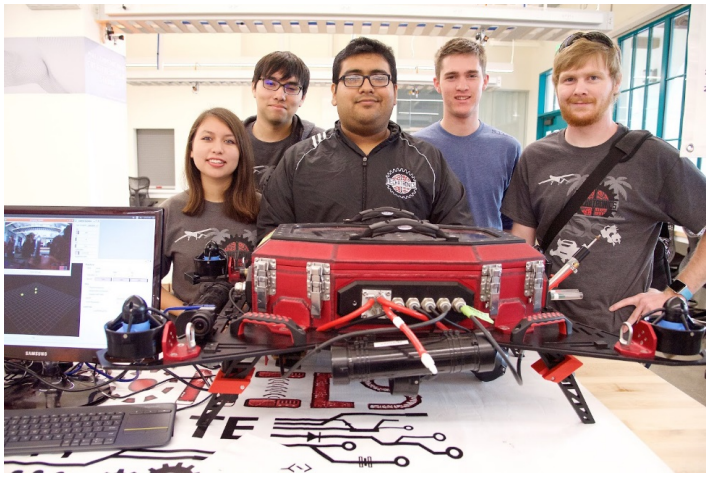


Undergraduate Program
Distinctive Features

San Diego State University

- We offer a high quality education at an affordable cost. The College ranks high in the nation among the Top Colleges for Engineering for Return on Investment (ROI).

- We provide a unique opportunity for students to learn about the cutting edge technology through coursework and projects.



Our Strategic Plan

San Diego State University

- The Strategic Plan for SDSU – Building on Excellence
  - Student Success
  - Research and Creative Endeavors
  - Community and Communication

Engineering Interdisciplinary Sciences Complex

San Diego State University

The new Engineering and Interdisciplinary Sciences (EIS) Complex will advance all three of our strategic priorities

EIS is home to:

- ✧Bioengineering Wearable Devices Research Lab
- ✧Creative Design Studio
- ✧Energy Research Lab
- ✧Nanofabrication Lab & Clean Room
- ✧Lavin Entrepreneurship Center
- ✧Zahn Innovation Platform

SAN DIEGO STATE UNIVERSITY

THANK YOU!

CCEE Department OVERVIEW

PREPARED FOR
MEETING WITH THE DELEGATION FROM THE REPUBLIC OF GEORGIA

BY
JANUSZ SUPERNAK, PH.D.
PROFESSOR AND INTERIM CHAIR
DEPARTMENT OF CIVIL, CONSTRUCTION,
AND ENVIRONMENTAL ENGINEERING
APRIL 9, 2018

Top 10 Reasons Why To Like (Love!) CCEE
(in alphabetical order)

1. Celebration of Diversity
2. Enrollment Growth
3. Faculty Quality
4. History of Strategic Planning
5. Industry Relations and Support
6. International Focus
7. Programs Quality/Accreditation
8. Research
9. Service to University and Community
10. Student Success

1. Celebration of Diversity

- History of addressing diversity in hiring
- Composition of the 13-person faculty
  - **one** African American
  - **three** Hispanics
  - **four** female professors
  - place of birth: **six** continents
- Examples of student diversity
  - high representation of Hispanics
  - EnvE program: **57%** of females

2. Enrollment Growth

- Increase in student numbers last 15 years

	Fall 2002	Fall 2017	Change
FTES	98	407	**up 315%**
Students	308	1131	**up 267%**

- Three programs currently: **CivE, ConE, EnvE**
- Expansion into: **ConM** and **ArchE**
- **Graduating 120 BS students in May 2018: Good for # 20 in the US (all universities)**

3. Faculty Quality

- All CCEE faculty have good **research record**
- **Focus on research** re-emphasized
- Google Scholar **H-factors** are respectable
- Searches bring **70-140** candidates - first choices hired
- All faculty and PT instructors teach very well, **get awards**
- Average student evaluations: **4.2/5.0 UG**; **4.4/5.0 Grad**
- Good **committee work;** tasks divided, completed timely
- Faculty **enthusiastic, hard working, committed**
- Sense of **pride; high morale; camaraderie**
- **CCEE Monthly: 39 editions** already

4. History of Strategic Planning

- Strategic planning **since 2000**; regular **updates**
- **3Cs**: Comprehensive, continuing, cooperative
- Based on **SWOT** analysis
- Fully **synchronized** with the **SDSU Strategic Plan**
- **Metrics** used to monitor progress
- **Focus areas**: Water, Transportation and Construction
- **Results**:
  - **Blue Gold Area of Excellence** contribution
  - National **University Transportation Center** – partnering With Virginia Tech and Texas A&M – **one of 5** in US
  - **$5.5M** support from Industry for **CEM** excellence
  - Proposals for **new,** needed **emphases**

5. Industry Relations and Support

- **CCEE Advisory Board**: strong factor in our success last 25 years
  - **20-30** industry leaders
  - helpful with **ABET, curriculum, philanthropy**
- Impressive **Endowment Portfolio** ($10+ million total); examples:
  - Leonhard - faculty + students
  - Blasker - faculty (EnvE)
  - Filanc - CEM program
  - Roel/AGC - faculty (ConE)
  - Doyle - ConE and CivE programs
  - Forrest - EnvE/Water students
  - Stone - students
- Multiple **interactions** (internships, seminars, project judging)
- New multi-million Construction Management Campaign

6. International Focus

- Our **diversity** brings good **understanding** of other cultures
- CCEE: College **pioneer** in **Study Abroad** programs
  - Krakow: **six** editions
  - Panama: **five** editions
  - Tbilisi: CivE, ConE **programs started** Fall 2017
- CCEE involvement in **International Projects**
  - $2.0 million World Bank Project, NU, **Afghanistan**
  - Dr. Walsh – Former Dean, **SDSU Georgia**
  - Dr. Ponce: projects in **Mexico, South America**
  - Dr. Alves: collaboration with **Brazil**
  - Dr. Dowell: research project from **Germany**
  - Dr. Mladenov: research project in **South Africa**
  - Dr. Valdes: Engineers Without Borders: **Central America**
  - Dr. Supernak: Projects in **Poland, Afghanistan, Georgia**

7. Program Quality

- **ABET accreditation**: **excellent record** over 30 years
  - 2015: **no** single concern for **CivE**; just **one concern** for **ConE**
  - **full accreditation** for EnvE, ConE **in first reviews**
  - intricate **process** in place
- **Industry verification of quality**
  - periodic **reviews** by Advisory Board
  - judging Senior Design projects
  - reputation of strong **hands-on** programs
- **Student evaluations** of courses: **high scores**
- **UG students** involvement in **research projects** and strong **industry links** got a rare **ABET praise**

8. Research

- Research: **primary factor in hiring**
- Several faculty supported by **prestigious grants**
- New faculty have **excellent start** in the research arena
- New Areas of Excellence attract **lead researchers**
- **New impetus** in sponsored research funding:
  - 2013: $ 439,014
  - 2014: $ 906,128
  - 2017: $1,787,328 $137.5 k per faculty per year
    307% increase over year 2013
- Potential for **expanding interdisciplinary research**: excellent

9. Service to SDSU and Community

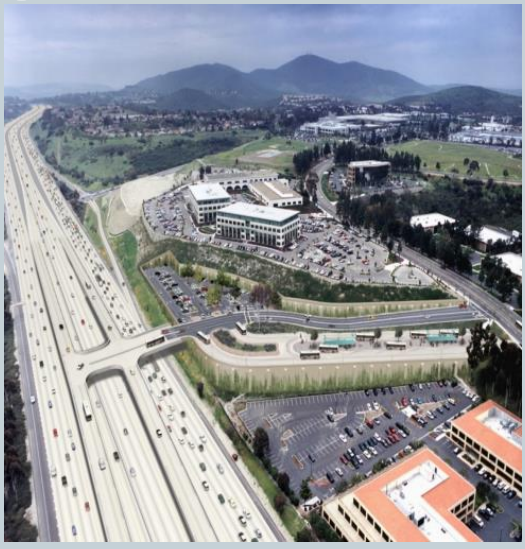
- CCEE: faculty, students **active** in professional organizations
- **Service**: national panels, journal reviews, proposal reviews
- Dedication to **student organizations advising**
- Strong involvement in **civic activities** outside engineering
- Student clubs success: strong **role of Faculty Advisors**
- Dr. Westermo: **California Director**, Project Lead the Way

10. Student Success

- Student Success: **primary goal** of Department, College, SDSU
- Student reps attend ABET-related meetings, **have voice**
- **Senior design projects**: industry judges praise **quality**
- Examples of **national visibility** of student achievements:
  - **ASCE**: - **top 5%** ranked nationally in several years
    - hosted **5** National/Regional events, last time: 2014
    - to host **National Concrete Canoe Competition,** 2018
  - **AGC/CMAA**: **Second place** in National Reno Competition, 2018
  - **EWB**: work on water purification, Central America

CCEE Focus Area 1: Broadly Defined WATER

CCEE Focus Area 2: Broadly Defined TRANSPORTATION



CCEE Focus Area 3: Broadly Defined CONSTRUCTION

CCEE 2020 Vision: April 2018 Check on Goals set in 2014

1.	**Top 100** national ranking for our graduate program	**ACHIEVED**
2.	Participation in **three** prominent **research centers**	**GOOD PROGRESS (WE HAVE 2)**
3.	**$150,000 per faculty** per year in grants	**VERY CLOSE, 2018 IS ON TRACK**
4.	**400+ FTES** in year 2020; increase in EnvE and ConE	**EXCEEDED ALREADY**
5.	**5+ Doctoral students** supported by CCEE faculty	**ON TRACK**
6.	CCEE participation in **SDSU Georgia program**	**ACHIEVED**
7.	**Twenty** CCEE research-active **professors**	**NEED MORE FACULTY**
8.	Average Teaching scores: **4.2 / 5.0**	**EXCEEDED ALREADY OVERALL**
9.	**20% of students** participating **in Study Abroad**	**ON TRACK**
10.	**Enough space**	**IMPROVEMENT BECAUSE OF EIS**

Department of Civil, Construction and Environmental Engineering

THAÍS DA C. L. ALVES, PH.D.
ASSISTANT PROFESSOR

J.R. Filanc Construction Engineering and Management Program

General Research Areas: **Construction / Construction Management**

Recent Accomplishments

- Completed a research grant on Supplier Quality Surveillance and was granted a 1-year extension (+funding) to further develop the topic (Construction Industry Institute - CII)
- Completed a research grant on student engagement in research and student chapters (ELECTRI).
- Faculty advisor of NECA Student Chapter that placed on the Green Energy Challenge Competition.
- 2012 CMAA Educator of year and CMAA Student Chapter of the year (Advisor) – Construction Management Association of America.
- 3 journal papers , 5 conference papers, and 1 report published in the last year (+ 1 under review).

Future Plans

- Resubmission of proposal on "learning from planning in construction projects".
- Development of a local benchmarking project on indicators and lean construction implementation .
- Continue to work with the CII and large EPC contractors, suppliers, and owners on improving the quality of products supplied to construction projects.
- Development of alternative course materials for my courses using video, iPad-generated drawings, and inclusion of design-related software in CONE 520 (design elective)

Education: University of California, Berkeley SDSU - 2009

M. ZIAD BAYASI, PH.D.. S.E.
PROFESSOR

Civil Engineering

General Research Areas: Concrete / Structural

Recent Accomplishments
- "Introduction to Reinforced Concrete Masonry Design," Textbook, Linus Learning, New York, 2014,887pp.
- "Introduction to Reinforced Concrete Design," Textbook, Linus Learning, New York, 2011, 485 pp.
- Experimental Study in Composite Slabs with Sanded Carbon Fiber Composite Deck.

Future Plans
- "A simplified Approach to Structural Design of Light – Framed Structures with Metal Studs," Textbook and Manual.
- Research Proposal to NSF about Composite Slabs with Sanded Carbon Fiber Composite Deck
- Research Proposal to Caltrans about Bridge Design with Composite Columns and Slabs.

Education: Michigan State University SDSU - 1990

Robert K. Dowell, Ph.D., PE.
Associate Professor

Civil Engineering

General Research Areas: Structural / Earthquake

Recent Accomplishments
- PI on two large, multi-year, NASSCO ship research projects (over $1.5 million of research to SDSU)
- Developed new seismic bridge analysis method (thousands of times faster than existing methods)
- Designed and built SDSU Shaking Table
- ASCE Outstanding Faculty Advisor – currently advising both ASCE Steel Bridge and Canoe teams
- PI for on-going Hilti anchor and building component research project
- Expert consultant for seismic analysis for tallest building on Guam
- Advising 10 graduate and undergraduate students, all working on the various research projects
- Prior multi-year NASSCO project was conducted at UCSD, all future NASSCO work will be done at SDSU
- Prior Hilti project at SDSU was as sub to UCSD; all future work is a direct contract between Hilti and SDSU

Future Plans
- Continue to build-up structural testing and analysis capabilities at SDSU
- Grow structural engineering at SDSU – more students and faculty
- Foster long-term relationship with NASSCO Shipyard and US Navy – 20 years and more
- Get Caltrans (and consultants) to use new bridge analysis method for all future California bridge designs
- Design and build very large, and unique, shaking table at SDSU – possibly largest in the world

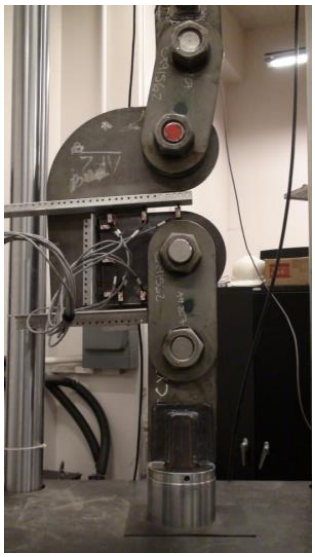
Education: University of California, San Diego SDSU - 2006

Structural Testing and Analysis of Bridges, Buildings and Ships

Robert K. Dowell, Ph.D., P.E.
Director, Structural Engineering Laboratory

Tallest Building on Guam

NASSCO Ship Structural Testing and Analysis

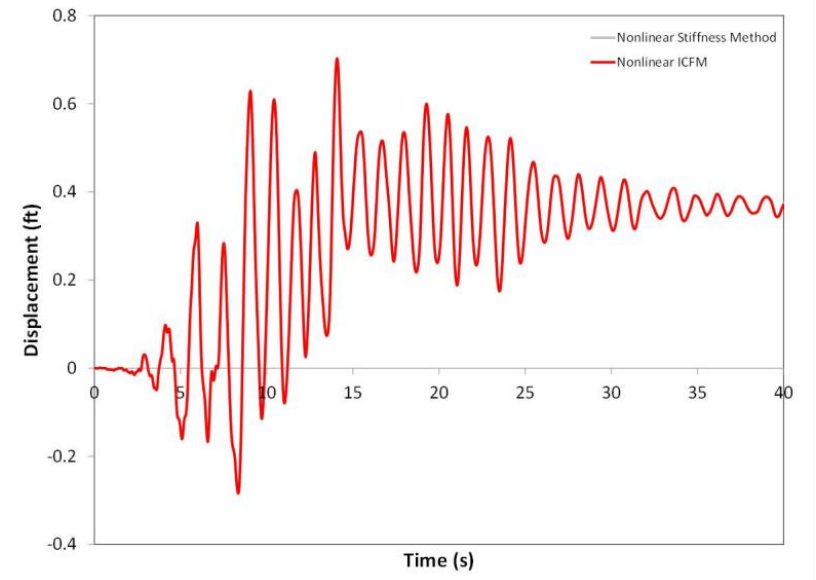


Hilti Structural Testing on SDSU Shaking Table

Bridge Structures (I-880 Replacement)

Fast Nonlinear Seismic Bridge Analysis

- Identical time-history results and 25,000 times faster -



Big SDSU Shaking Table for the Future

- To be built on SDSU-owned land north of I-8
  - build access tunnel under the I-8 freeway
- Modular design with 12 separate 10'x10' shaking tables – on rails
- Can be configured in different ways
  - spaced 150' apart
  - matrix of 4x3 tables connected by rigid beams (largest shaking table in the world)
- Will bring added recognition to COE and SDSU

My Current Research Team

TEMESGEN GAROMA, PH.D.
ASSOCIATE PROFESSOR

Environmental Engineering

General Research Areas: Renewable Energy, Wastewater, and Water

Recent Accomplishments

- Completed five projects
- Bill and Melinda Gates Foundation
- California Energy Commission (CEC)
- Submitted two proposals - to CEC and the Spencer Foundation
- Published two articles in peer-reviewed journals
- Working on two proposals, due before the end of the year

Future Plans

- Establish a research group on bio-mass based renewable energy
- Hire postdocs
- Contribute to the growth of the ENVE program

Education: University of California, San Diego & SDSU — SDSU - 2007

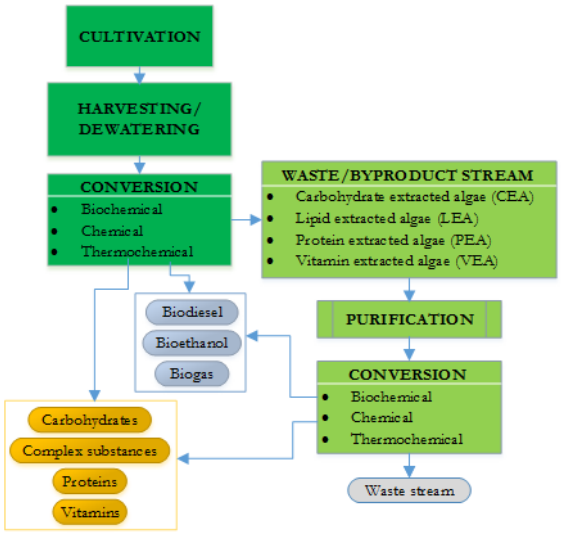
Renewable Energy: Biomass

- Algae
  - High productivity rate
  - Ability to tolerate a wide range of growth conditions
  - Lack of competition for land with food crops
  - Composed of carbohydrates, lipids, and proteins
- Organic wastes
  - Reduce water and air pollution
  - Reduce dependence on imported oil
  - Create green jobs

Renewable Energy from Algal Biomass

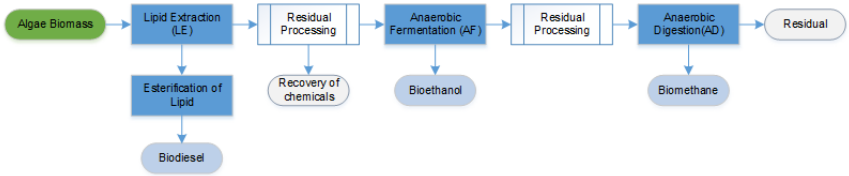
- Challenges
  - The high cost of producing algal biomass
  - The low yield of target biofuels produced from algae
  - Biofuels are low-value products
- The focus of my research
  - Increase overall biofuels yield by recovering energy contained as biodiesel, bioethanol, and biomethane
  - Produce platform chemicals, *e.g.* carbohydrates, proteins, and vitamins, which in turn can be used as feedstock for the production of high-value products

Biorefinery Concept

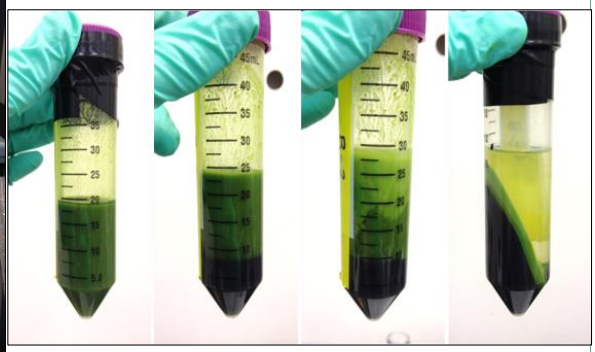


Proposals

- Submitted
  - Development of next-generation biomass waste fuel sources as feedstock for bioenergy production, *CEC – $2.1 million*
- Being developed
  - Integrated system for algal biofuels, *CEC – $1.0 million*



  - LEA and PEA: the next-generation feedstock for biomethane production, *CEC – $150K*



ALICIA KINOSHITA, PH.D.
ASSISTANT PROFESSOR

Civil Engineering

General Research Areas: Water Resources, Hydrology, & Remote Sensing

Recent Accomplishments

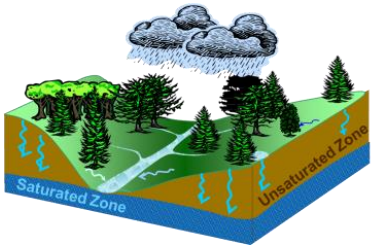
- Transitioned to SDSU!
- Campus Resources
  - -CCEE Seminar Series (SDSU Alumni Engagement)
  - -SDSU GREW Fellow
- In 2014 -- 2 peer-reviewed manuscripts published; 3 in review/re-revision
- 2014 Fall American Geophysical Union

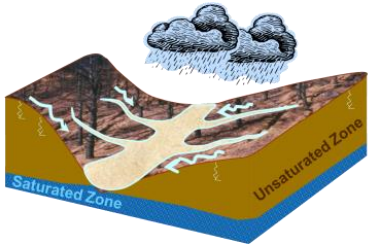
Future Plans

- Proposals/Projects
  - -Interdisciplinary wildfire research in the "Anthropocene"
  - -Hydraulic and geomorphic assessment in Yosemite Valley
  - -Department collaboration
- Watershed sustainability research with the San Bernardino National Forest
- International Erosion Control Association Conference – Western Chapter

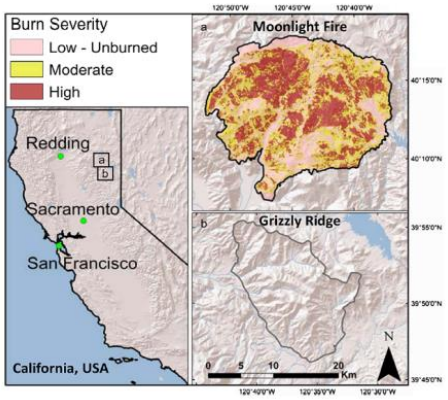
Education: University of California, Los Angeles SDSU - 2014

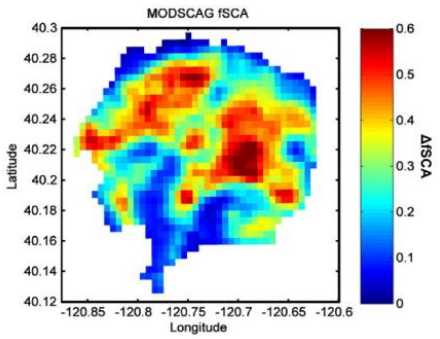
Post-Fire Hydrology





Remote Sensing of Snow Covered Area





- Difference map of winter (Jan-Mar) pre- and post-fire snow covered area.
- More snow accumulation and earlier melt-out over the 5 year study

Micheletty et al. 2014 in HESS

PANAGIOTIS MITROPOULOS, PH.D.
ASSOCIATE PROFESSOR

J.R. Filanc Construction Engineering and Management Program

General Research Areas: Construction Engineering & Management

Recent Accomplishments

- Completed NSF Career Award research
- Published 5 journal papers
- Advised 5 Graduate Students
- Received 2014 National Teaching Award from Associated Schools of Construction

Future Plans

- Submit NSF Research Proposal on Teamwork and Accident Prevention
- Submit Research Proposal on Production System Design and Safety
- Contribute to the development and growth of the graduate program
- Develop a lab to simulate and study the effect of production practices on construction errors and safety

Education: Stanford University SDSU - 2011

Safety as an Emergent Property of the Production System

Work Practices and Team Processes of High Reliability Crews

PI: Panagiotis "Takis" Mitropoulos

Program Area: Civil Infrastructure Systems Grant #: 1158572

San Diego State University

Background

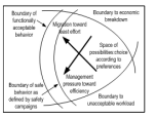
Research Challenge

An important challenge for construction researchers and practitioners is to develop work systems (production processes and teams) that are simultaneously highly productive and highly safe.

Three paradigms of occupational safety research:

- **Normative**
- **Human Error**
- **Cognitive**

Current theories and practices of construction accident prevention are rooted in the Normative paradigm. They have important limitations as they ignore the role of work design, production practices and team processes.

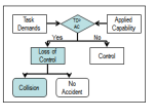


"Migration to boundary" model of work behavior

Theoretical Foundation

A Cognitive Approach to Accident Causation

This research is grounded in a cognitive perspective – the features of the task and the work situation shape the work behaviors and the likelihood of errors and accidents.



Task demand – Capacity Interface model of driving

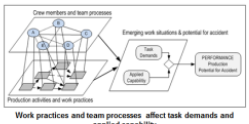
Research Questions

- Which work practices and team processes at the crew level simultaneously support higher production and higher reliability (reduced likelihood of accidents)?
- What are the specific mechanisms by which these practices and processes affect the likelihood of accidents?

Research Framework

Research Objective

- Explore the work practices and team processes of High-Reliability Crews- that is, foremen and crews who perform high risk work and consistently achieve exceptional production and safety performance.
- Develop empirically grounded theory to explain which work practices and team processes affect task and safety performance and through what mechanisms.



Work practices and team processes affect task demands and applied capability

Research Methodology

In-depth field case studies and comparative analysis of exceptional and average foremen in high risk trades: framing, masonry, concrete, roofing, steel, electrical.

Residential Framing | Masonry | Concrete | Roofing

Identify High Reliability foremen and crews | Document & compare crew practices | Analyze effect on task demands

Results

1- Practices of High Reliability Foremen:

- Varying emphasis on safety practices!
- Focus on error prevention through effective production control.
- Reduce task complexity and task demands (physical, mental, temporal).
- Match workers capabilities with task demands.
- Emphasize extensive cross checking, varying helping, low absenteeism.

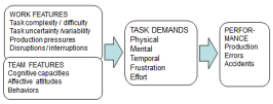
High Reliability crews

2- New understanding of the relationship between production and safety

Production performance (cost or speed) can be improved by:

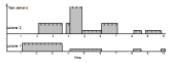
1. Increasing the task demands on the crew, which increases the likelihood of errors and the safety effort required.
2. Reducing the task demands, by changing features of the task and/or the team.

3- New understanding of task features, task demands and errors & accidents



4- New tool for operations analysis

The Task Demands Assessment Methodology quantifies the safety risk of actual and simulated operations.



Task demand over time for paving operation

NATALIE MLADENOV, PH.D.

ASSISTANT PROFESSOR

Environmental Engineering

General Research Areas: Water Quality, Water Reuse

Top Recent Accomplishments

- Awarded NSF IRES Project to study decentralized water reuse ~$250,000 (2014 – 2017)
- Awarded NSF RAPID Project to study arsenic mobility in groundwater ~$50,000 (2014 – 2015)
- Published recently in *Journal of Hydrology* , *Environmental Science and Technology, and Nature Communications*.
- ASCE ExCEEd Teaching Fellow (2013).

Future Plans

- Collaboration with D. Lipson (SDSU Biology)
- Preliminary research on water reuse in new engineering building
- NASA proposal with A. Kinoshita on Subsurface Wetland Methane Emissions
- Infuse project-based learning into teaching – Environmental Engineering Laboratory

Education: University of Colorado SDSU - 2014

NSF International Research Experience for Students (2014 – 2017)

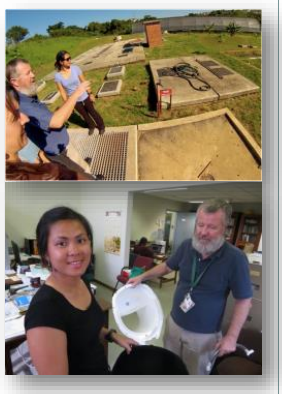
IRES: US-South Africa collaboration on sustainable sanitation and energy and resource recovery from wastewater

- STUDENT RESEARCH OPPORTUNITIES

Summer international research
4 undergrads and 1 grad student; 3 years of support:

Decentralized wastewater technology
- Energy from fats, grease, oils
- Pathogens in effluent

Urine diversion dry toilets
- Struvite production and phosphorus recovery

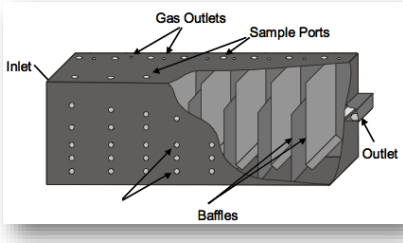


IRES: US-South Africa collaboration on sustainable sanitation

MLADENOV RESEARCH GROUP OPPORTUNITIES THIS SUMMER

- Membrane bioreactor addition & biofouling monitoring
  - Fluorescence in-situ technology
- Measuring CO_2 and methane
  - Developing capabilities in lab now
- Aquaponics with tilapia
  - New graduate student from Uganda

Anaerobic baffled reactor



FUNDING IDEAS

- **USAID-NSF PEER** on use of membranes in urban settlements
- **NSF** Career: wastewater mining at SDSU (new engineering building)
  - Summer 2015
- **EPA** People, Prosperity, and the Planet competition
  - Fall 2015

Membrane filter added to last stage

VICTOR M. PONCE, PH.D.
PROFESSOR

Civil Engineering

General Research Areas: Water Resources, Hydrology, Hydraulics

Recent Accomplishments

- Completed several grass-roots projects on groundwater sustainability in East San Diego County
- Developed an ability in my laboratory to do online calculations (200 calculators)
- Developed an ability in my laboratory to produce online videos (228 videos)
- Published three free online books
- Received Honorary Doctorate by the National University Hermilio Valdizan, Peru

Future Plans

- Interdisciplinary global--warming related glaciology research in the White Range, Peru
- Continue to work on groundwater sustainability in East San Diego County
- Continue to develop online calculators
- Continue to develop online videos
- Implement Ajax to continue to improve the functionality of my website

Education: Colorado State University SDSU - 1980

JANUSZ C. SUPERNAK, PH.D.
PROFESSOR & INTERIM CHAIR

Civil Engineering

General Research Areas: Transportation

Recent Accomplishments

- Led a 15-person Transportation team of researchers from FIVE SDSU Colleges to apply to federal DOT for University Transportation Center (UTC)
- Invited as a keynote speaker to the International Symposium on Road Pricing, BOKU University, Vienna, Austria, 2014
- Voted San Diego County 2014 Engineering Educator of the Year
- Outstanding Faculty Advisor, ASCE National Headquarters , 2013 and 2014 (top 5% nationally)
- PI on the $2.0 million World Bank Afghanistan Strengthening Civil Engineering Education project
- 200+ citations of articles published from work as PI on the $1.2 million FHWA Congestion Pricing project
- Member, Editorial Board, International Journal of Civil Engineering and Urban Planning

Future Plans

- Establish a consortium of universities to create UTC headquartered at SDSU
- Lead the Department effort to successfully re-accredit our three programs through ABET in 2015
- Hire additional research-active faculty; advance interdisciplinary research in areas of focus
- Expand Transportation Research Lab
- Initiate coordinated efforts to achieve Top 100 national ranking for our CEE graduate program

Education: Technical University of Warsaw, Poland SDSU - 1984

Janusz Supernak, PI
I-15 FasTrak Project

- Interstate 15: **FIRST** Dynamic Congestion pricing **in the world**
- The idea: Let solo drivers pay to use HOV lanes; central computer will increase fee if V=62 mph is threatened

- Drivers value this new way to beat traffic
- Lexus lanes? Not really!
- Carpool **increased** not decreased
- Project successful; **copied in other cities**
- **200+** journal citations, **180** paper articles (NYTimes, USA Today, The Economist)
- **SDSU lead**, UCI and consultants on the team

Janusz Supernak, Pedestrian Countdown Signal Project

- The key question: does PCS **improve safety** for pedestrians?
- Study in downtown San Diego – for the City of San Diego
- The method: behavior of each pedestrian is **modeled individually**
- **Multivariate analysis** of many factors (population, geometry, traffic)
- **Main result**: PCS are **effective on long crossing**
  PCS **NOT effective on short crossings** against light traffic
- Result **published** in Open Journal of Civil Engineering
- Result **confirmed** by a study done by University of Hong Kong

JULIO VALDES, PH.D.
PROFESSOR

Civil Engineering

General Research Areas: Geotechnical / Foundations

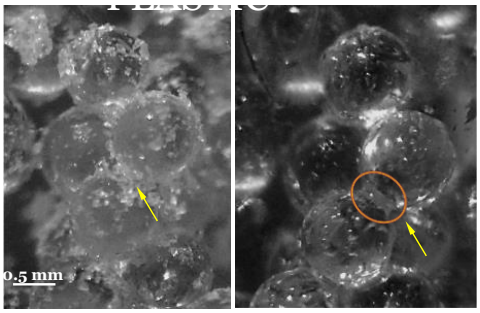
Recent Accomplishments

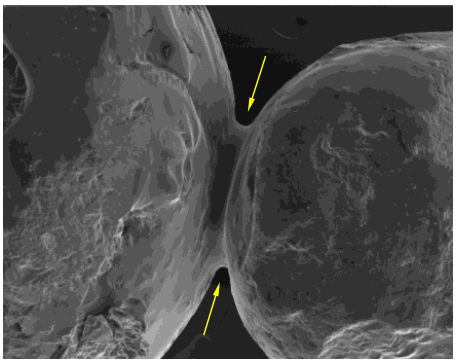
- NSF grant: *Sole PI*: Propagation of Localized Compaction in Granular Materials (CBET)
- NSF grant: *Lead PI*: Heat-Induced Polymer Bonding of Coarse Aggregates (CMMI)
- Discovered the periodic propagation of compaction bands in brittle granular materials
- SDSU Senate Distinguished Professor Award
- Published three journal papers

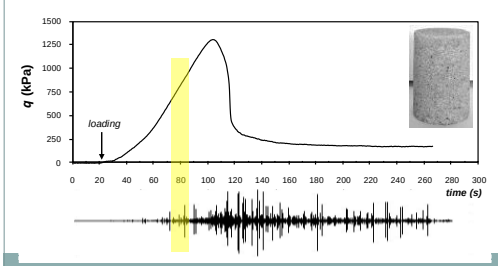
Future Plans

- Patent a novel filtration technology under development at SDSU
- Travel to Sydney, Australia for research collaboration
- NSF proposal: particulate injections in dry granular media (CBET)
- NSF proposal: expansive soil mitigation with granulated tire rubber (CMMI)
- Online course development (w/ ITS)

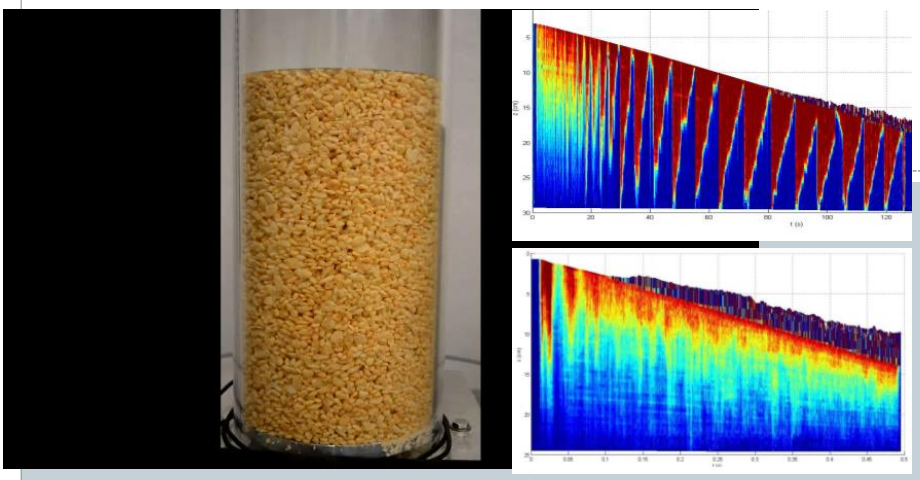
Education: Georgia Institute of Technology SDSU - 2002







Sustainability



Dynamical system
Multiple (or no) characteristic scales

Emergent phenomena = manufacturing potential

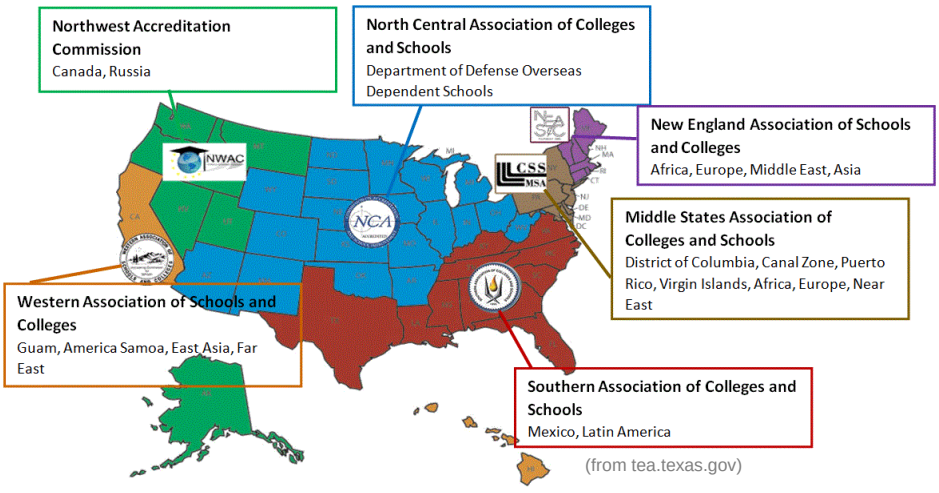
Institutional Accreditation and Program Assessment at SDSU

Stephen Schellenberg
Professor of Geological Sciences
Assistant Vice President for Educational Effectiveness
WSCUC Institutional Accreditation Liaison Officer

- Tour of regional accreditation, with focus on WASC and SDSU
- Overview of program assessment at SDSU and relation to ABET
- Explore benefits of curricular mapping for faculty and students

Accreditation in the United States

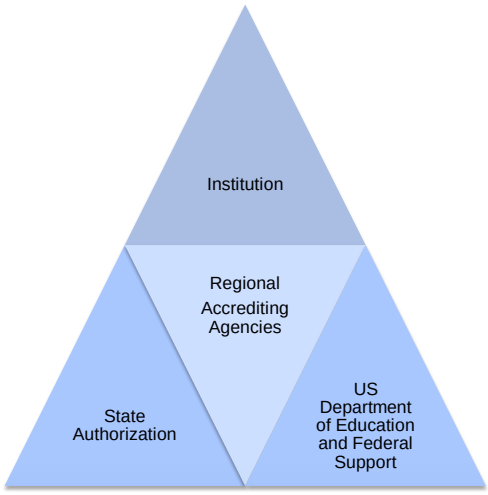
- Three "Flavors" of Accreditation:
  - National (e.g., ACICS, DEAC)
  - Regional . . . WASC is one of five regional accreditors
  - Disciplinary (e.g., ABET, AACSB, APA, NAST, etc.)



(from tea.texas.gov)

Regional Accreditation in the United States

- Characteristics:
  - Non-governmental
  - Focus on quality and improvement
  - Entire institution
  - Trained peer reviewers
- Core Values:
  - Institutional Autonomy
  - Institutional Diversity
  - Academic Freedom
  - Shared Governance
  - Student Success
- Core Strengths
  - Quality assurance
  - Opportunity for self-improvement
  - Alternative to government regulation
  - Tailored to local context
  - Transfer of credits



Regional accreditors are recognized by U.S. Secretary of Education as reliable authorities concerning the quality of education or training offered by institutions and programs

Core Commitments of WASC

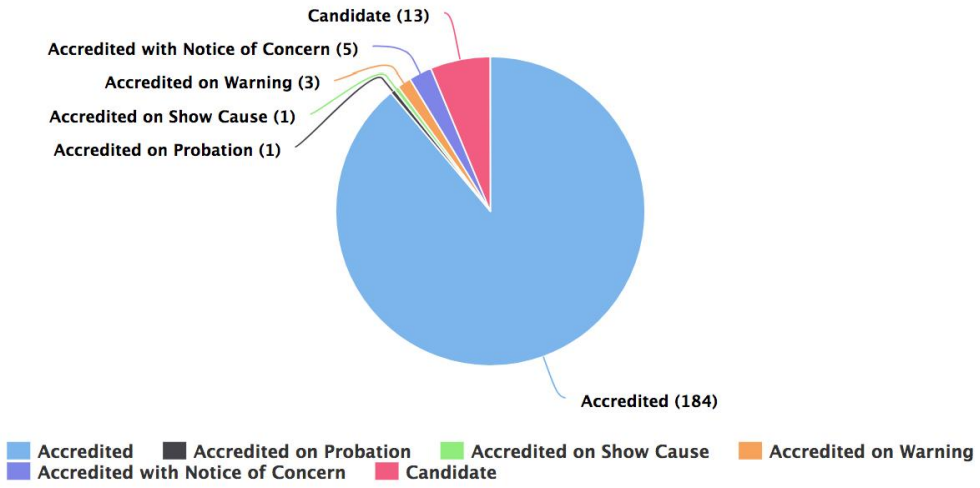
- Student Learning and Success: "Institutions have clear educational goals and student learning outcomes . . . Institutions support the success of all students and seek to understand and improve student success"
- Quality and Improvement: "Institutions are committed to high standards of quality in all of their educational activities . . . Institutions demonstrate the capacity to fulfill their current commitments and future needs and opportunities."
- Institutional Integrity, Sustainability, and Accountability: " . . . Institutions engage in sound business practices, demonstrate institutional integrity, operate in a transparent manner, and adapt to changing conditions."

Accreditation is increasingly performing three different functions within each review, with accountability playing an ever-larger role

	Gate-keeping/ Compliance Centered	Improvement–Centered	Accountability-Centered
Scope of Review	All standards applied to assure compliance	Key areas selected and approved by accreditor for improvement	Specific areas identified as part of all reviews to address common policy issues—e.g., retention/ graduation rates, student learning outcomes
Level of judgment	Must demonstrate standards are met at least at minimum level	Simplifies compliance review and primary emphasis on recommended improvements	External reference points reviewed and evaluated—by comparative indicators of institutional type
Public Reporting	Public announcement of grant of accreditation	Reports internally circulated for improvement; accrediting action publicly reported	Meaningful and clear public information about institutional performance and commission actions reported

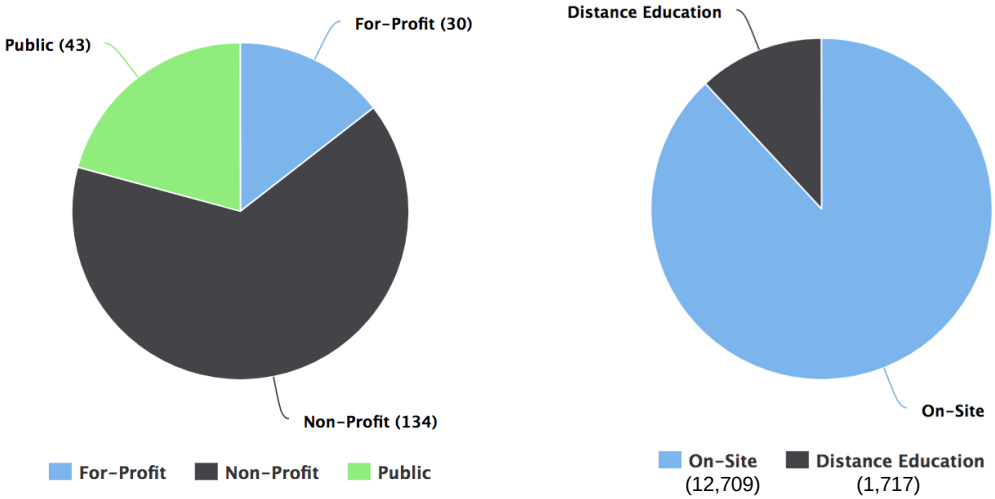
(from wascsenior.org)

WASC Institutions by Accreditation Status



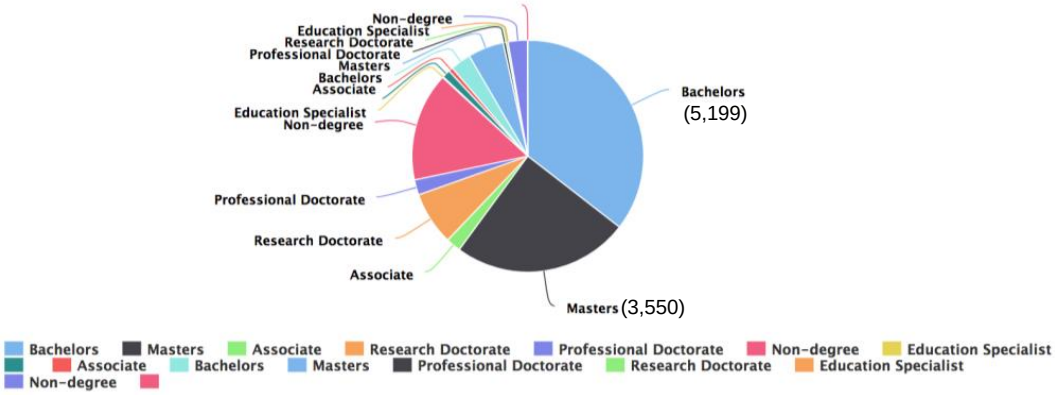
(from www.wscuc.org/inforgraphics)

WASC Institutions
Financial Type and Modality of Offered Degrees



(from www.wscuc.org/inforgraphics)

WASC Institutions – Distribution of Offered Degree Types



Accredited institutions include research/comprehensive/liberal-arts/graduate, regional/international, general/specialized, public/private, onsite/online, non-profit/public/for-profit, secular/faith-based, large/small, and old/new that together serves over 1,200,000 students!

(from www.wscuc.org/inforgraphics)

Overview of WASC Institutional Accreditation Process for SDSU

September 2015:
SDSU submits Institutional Report, Self-Review Under the Standards, Inventory of Educational Effectiveness, and various federal compliance forms to WASC

November 2015:
WASC Review Team conducts One-Day Offsite Review to determine scope of Accreditation Visit and identify any issues related to compliance with the Standards

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April 2016:
WASC Site Visit to SDSU-Georgia and partner institutions

July 2016:
WASC Senior College and University Commission (WSCUC) reaffirms SDSU's accreditation for 10 years via a Formal Notification and Official Record of Action

Additional information and all documentation available at wasc.sdsu.edu

Institutional Report Includes "Self-Review Under the Standards"

STANDARD 1
STANDARD 2
STANDARD 3
STANDARD 4

Creating an Organization Committed to Quality Assurance, Institutional Learning, and Improvement

- Quality Assurance Processes
- Institutional Learning and Improvement

The institution engages in sustained, evidence-based, and participatory self-reflection about how effectively it is accomplishing its purposes and achieving its educational objectives. The institution considers the changing environment of higher education in envisioning its future. These activities inform both institutional planning and systematic evaluations of educational effectiveness. The results of institutional inquiry, research, and data collection are used to establish priorities, to plan, and to improve quality and effectiveness.

Four Standards Contain a Total of 33 "Criteria for Review" (CFRs)

2.4 The institution's student learning outcomes and standards of performance are developed by faculty and widely shared among faculty, students, staff, and (where appropriate) external stakeholders. The institution's faculty take collective responsibility for establishing appropriate standards of performance and demonstrating through assessment the achievement of these standards.

GUIDELINE: Student learning outcomes are reflected in course syllabi.

See also CFR 4.3, 4.4

3.2 Faculty and staff recruitment, hiring, orientation, workload, incentives, and evaluation practices are aligned with institutional purposes and educational objectives. Evaluation is consistent with best practices in performance appraisal, including multisource feedback and appropriate peer review. Faculty evaluation processes are systematic and are used to improve teaching and learning.

See also CFR 1.7, 4.3-4.4

4.1 The institution employs a deliberate set of quality-assurance processes in both academic and non-academic areas, including new curriculum and program approval processes, periodic program review, assessment of student learning, and other forms of ongoing evaluation. These processes include: collecting, analyzing, and interpreting data; tracking learning results over time; using comparative data from external sources; and improving structures, services, processes, curricula, pedagogy, and learning results.

- Distance Education and Technology-Mediated Instruction Policy
- Program Review Resource Guide
- Substantive Change Policy; Substantive Change Manual

See also CFR 2.7, 2.10

Institutional Report Required Components

- **Introduction**: Institutional Context; Response to Previous Commission Actions
- **Compliance**: Review under the WSCUC Standards and Compliance with Federal Requirements; Inventory of Educational Effectiveness Indicators
- **Degree Programs**: Meaning, Quality, and Integrity of Degrees
- **Educational Quality**: Student Learning, Core Competencies*, and Standards of Performance at Graduation
- **Student Success**: Student Learning, Retention, and Graduation
- **Quality Assurance and Improvement**: Program Review; Assessment; Use of Data and Evidence
- **Sustainability**: Financial Viability; Preparing for the Changing Higher Education Environment
- **Institution-specific Themes(s)**: Optional
- **Conclusion**: Reflection and Plans for Improvement

For each component, WASC provides helpful references to associated CFRs as well as question prompts

** Oral Communication, Written Communication, Information Literacy, Quantitative Reasoning, Critical Thinking*

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WASC Senior College and University Commission (WSCUC)
– Nine Commendations to SDSU –

1. *The deep dedication of faculty, staff, administrators, and student leadership to collaboration and transparency and to working in partnership to lead student success*
2. *Improvements in retention and graduation rates while increasing the diversity of the student body and closing achievement gaps*
3. *Development of a comprehensive strategic plan with broad participation from university stakeholders*
4. *Remarkable success in fundraising*
5. *Capital improvements designed to strengthen student success, particularly the facilities for addressing the needs of commuter students*
6. *Maintaining a high volume of research grants and contracts in a very competitive national environment*
7. *Astute financial management to maintain the quality of the university while mitigating the deep cuts in state appropriations*
8. *Implementation of an integrated program of high impact practices, including undergraduate research and study abroad, and adopting policies that require these experiences for undergraduates*
9. *Outreach to underserved local communities.*

WASC Senior College and University Commission (WSCUC)
– Four Recommendations to SDSU –

1. ***Review the general education program*** *to (a) strengthen its alignment with institutional goals, (b) enhance its integration into the overall curriculum, (c) improve understanding among students as to its purposes, and (d) create an effective infrastructure to support coordination across academic programs (CFR 2.2a). The Commission is pleased to learn that SDSU will be re-examining the general education curriculum, course options, and the experience for students.*

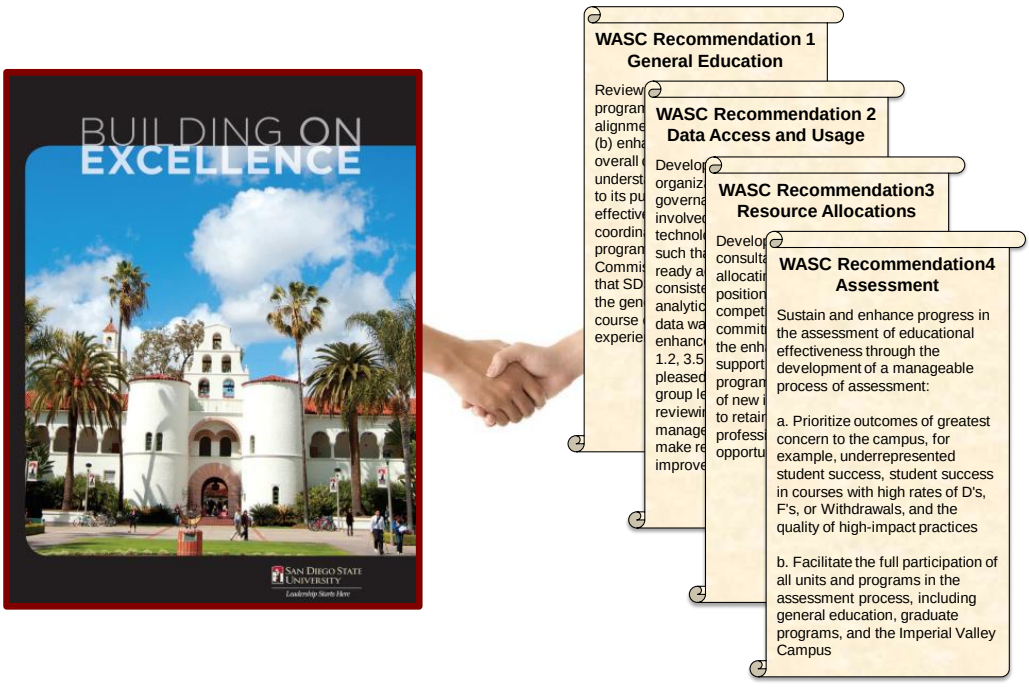
2. ***Develop or strengthen systems, organizational relationships, and governance infrastructure involved in both information technology and data management such that faculty and staff have ready access to reliable and consistent information and shared analytical tools -perhaps via a data warehouse -that can enhance student success*** *(CFRs 1.2, 3.5, 4.2). The Commission is pleased to learn that a working group led by the CIO will be reviewing enterprise and data management systems and will make recommendations for improvement as needed.*

WASC Senior College and University Commission (WSCUC)
– Four Recommendations to SDSU –

3. **Develop, via an appropriately consultative process, a plan for allocating faculty and staff positions** to address multiple and competing needs, among them: a commitment to student success; the enhancement of diversity; support of existing graduate programs; and the development of new initiatives. Enhance efforts to retain faculty and staff through professional development opportunities (CFRs 3.1, 3.2, 3.3).

4. **Sustain and enhance progress in the assessment of educational effectiveness through the development of a manageable process of assessment**:
   a. Prioritize outcomes of greatest concern to the campus, for example, underrepresented student success, student success in courses with high rates of D's, F's, or Withdrawals, and the quality of high-impact practices
   b. Facilitate the full participation of all units and programs in the assessment process, including general education, graduate programs, and the Imperial Valley Campus

Strategic Planning and WASC Recommendations



Institutional Accreditation and Program Assessment at SDSU

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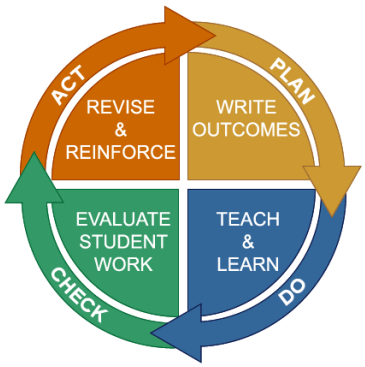
- Explore benefits of curricular mapping for faculty and students



(www.westminster.edu)

ABET Criterion 2 – Program Education Objectives

The program must have published program educational objectives that are consistent with the mission of the institution, the needs of the program's various constituencies, and these criteria. There must be a documented, systematically utilized, and effective process, involving program constituencies, for the periodic review of these program educational objectives that ensures they remain consistent with the institutional mission, the program's constituents' needs, and these criteria.

Program Educational Objectives: Broad statements describing what graduates are expected to attain within a few years after graduation	*Not required for SDSU, but implicit within many Degree Learning Outcomes (DLOs) and Course Learning Outcomes (CLOs)*
Student Outcomes: What students are expected to know and be able to do by time of graduation; relate to knowledge, skills, behaviors acquire as students progress in program	*Similar to SDSU's Degree Learning Outcomes (DLOs)*
Program Criteria: Additional specificity for interpreting general criteria for a given discipline; requirements limited to the areas of curricular topics and faculty qualifications	*May be expressed within Degree Learning Outcomes (DLOs), Course Learning Outcomes (CLOs), and Measures for these outcomes Depending on academic unit*

(http://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2018-2019/)

ABET Criterion 3 – Student Outcomes

The program must have documented student outcomes that prepare graduates to attain the program educational objectives. Student outcomes are outcomes (a) through (k) plus any additional outcomes that maybe articulated by the program.

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

(http://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2018-2019/)

Essence of Assessment

- **Establish** our expectations for student achievement with students and the broader public (DLOs, CLOs, and Curricular Maps)
- **Celebrate** student achievement based on evidence of learning (Measures, Targets, Findings, and examples of student work)
- **Demonstrate** our responsiveness to student needs (Action Plans and Loop-Closing)

The important question is not how assessment is defined, but whether assessment information is used. – Palomba and Banta (1999)

The critical thing about assessment is the conversation among faculty it invokes. The data may be the spur to the conversation, but the conversation is the critical thing. – Senter (2001)

Best Practices for Developing Effective Outcome Statements

- Express the capacities, capabilities, competencies, and/or predispositions that students acquire as a result of learning activities and processes
- Communicate to multiple stakeholders what students are expected to be able to achieve as a result of learning opportunities and efforts
- Should be overt, specific, observable, and assessable
- Recommended expression as transitive "action" verb and direct object
- Exist at the course and degree levels

If you don't know where you're going, how will you know when you have arrived?

(from www.nerdfitness.com)

SDSU Outcomes Exist at the Course and Degree Level

Course Learning Outcome (CLO):
At the end of their course, students should be able to:

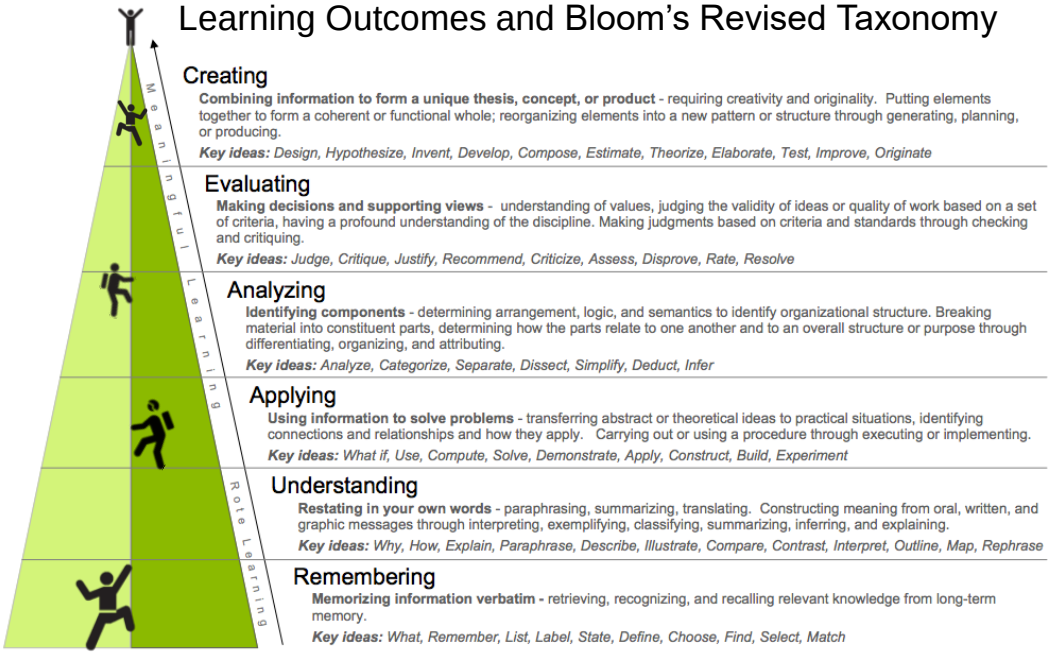
- Analyze simple resistive circuits
- Compute transient response of first-order circuits by inspection

Degree Learning Outcome (DLO):
At their graduation, students should be able to:

- Demonstrate technical competence in the analysis and design of electrical systems

- Course Learning Outcomes (CLOs):
  - Inform course content and design
  - Explicitly established within course syllabi
  - Progressively build capacity for achievement of DLOs
- Degree Learning Outcomes (DLOs):
  - Provide broad context and framework for courses and their CLOs
  - Situated relatively high on Bloom's taxonomy (e.g., evaluating, creating)
- DLOs at SDSU are currently divided among:
  - "Universal" Essential Capacities and Area Goals of General Education
  - "Local" Degree Learning Outcomes developed by academic units

Learning Outcomes and Bloom's Revised Taxonomy

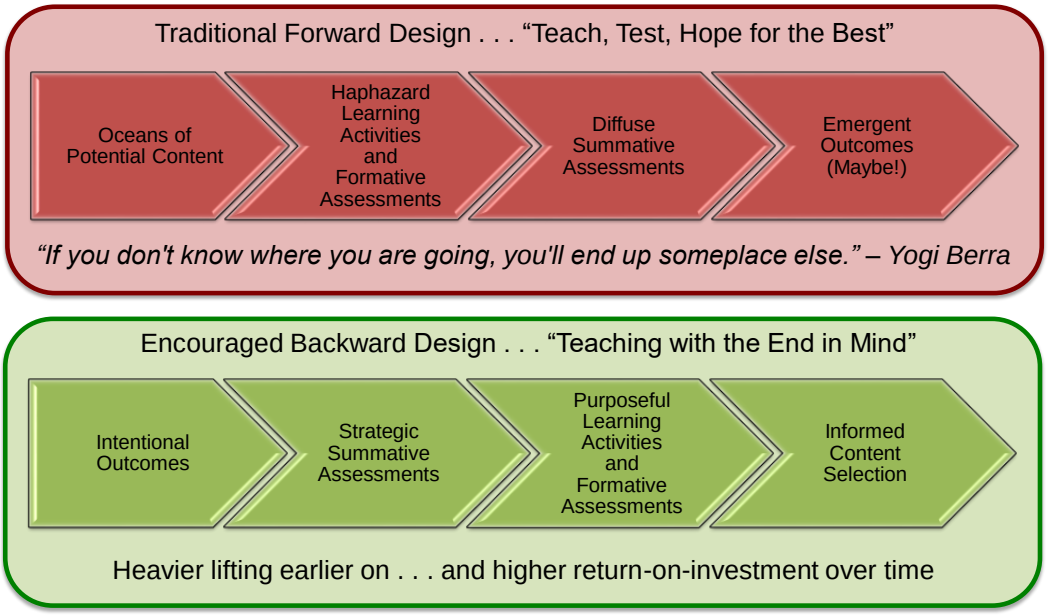


We encourage sequences of outcomes that help students climb the cognitive pyramid during your course and over their broader program of study

– Note that affective (emotional) and psychomotor (physical) taxonomies also exist –

(Bloom's Revised Taxonomy from cas.lsu.edu; climber icons from clkr.com)

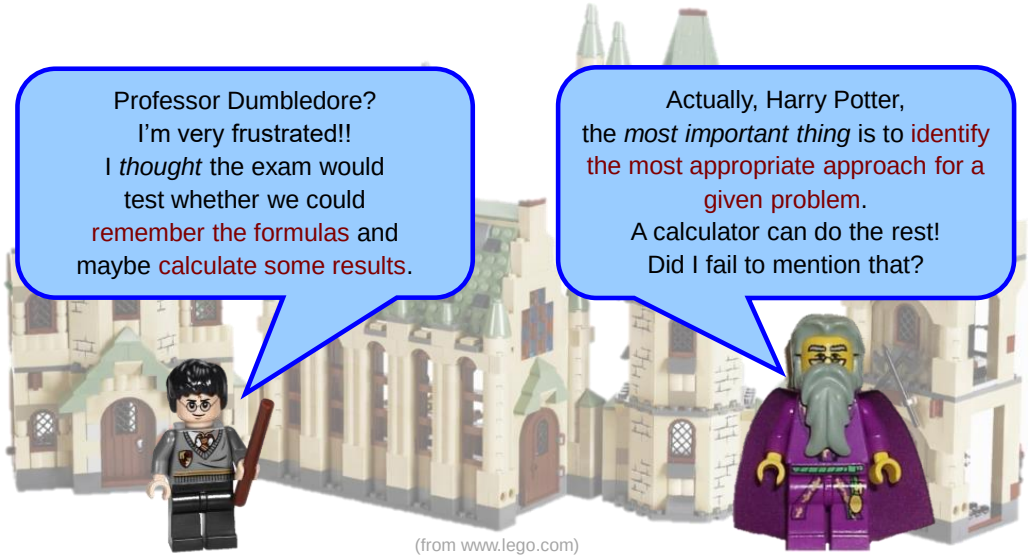
Backward Versus Forward Design of Courses and Degrees



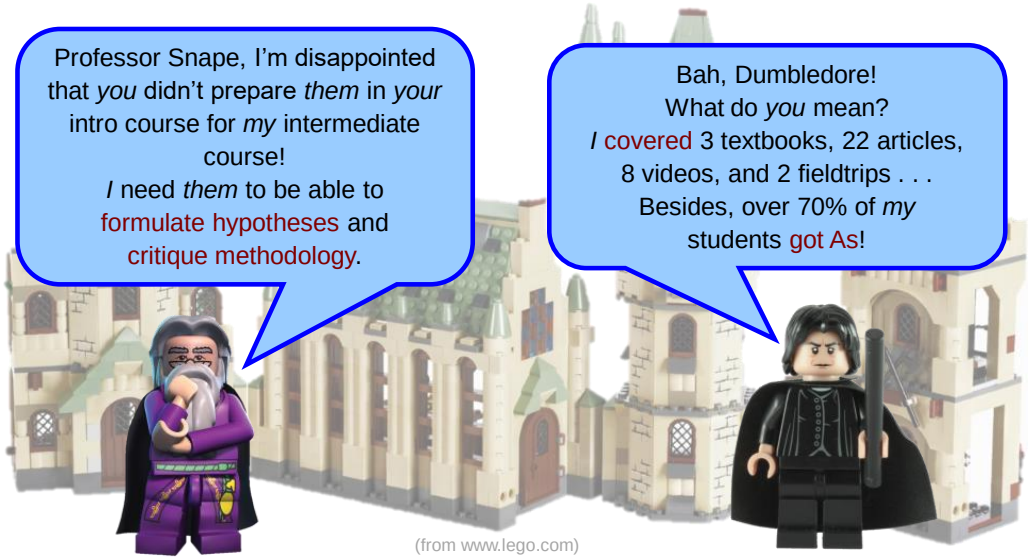
Existing designs may be externally constrained, but can always be improved . . .
Effective assessment involves identifying and acting on opportunities for improvement

How Outcomes Benefit Students

- Reduce confusion
- Establish expectations
- Contextualize course content
- Promote motivation and achievement
- Contextualize course within broader program



(from www.lego.com)



(from www.lego.com)

How Outcomes Benefit Students

- Focus conversations on student learning
- Contextualize courses within program
- Reveal curricular gaps and overlaps
- Provide framework for assessment
- Serve as "talking-points" to stakeholders

Which Statement More Clearly Expresses an Outcome?

Statement A:
You will learn to animate characters in a credible dramatic scene, including a central character who acts with discernable motives.

Statement B:
I hope to communicate an appreciation of the ways that animation can contribute to the perceptions that audiences have of characters.

Above is a great *instructor-centered goal*, but not a *student-centered outcome*

(Images: © Nickelodean)

Which Statement is a Better-Communicated Outcome?

Statement A:
You will learn about characters in 18th-century novels and the circumstances that influenced development of their values and traits.

Statement B:
You should be able to write an essay that describes characters in an 18th-century novel and cite circumstances likely to have influenced development of these characters' values their and traits.

Why is Statement B a better communicated SLO? If desired, how could it be shortened?

(Images: © Nickelodean)

Transforming Instructor Goals into Student Outcomes

Instructor Goal:
Discussions of controversial political issues will encourage open exchanges and tolerance of other viewpoints.

Student Outcome:
During discussions about politics, you should be able to listen to speakers well enough to:

- verbally summarize other speakers' viewpoints
- seek clarification from original speaker
- incorporate clarifications in a revised summary

*Notice the "**CAP**" structure of this CLO:*
*- **C**ondition: "During discussions about politics . . . "*
*- **A**ction: ". . . listen to speakers well enough to . . ."*
*- **P**roduct: The three bullet points*

Core Source of Data: Direct and Indirect Measures

- Direct Measures involve the examination or observation of student work with respect to one of more outcomes
  - Standardized and local exams
  - Portfolios
  - Simulations
  - Behavioral observations
  - Performance appraisals
- Indirect Measures involve self-reported or third-party-reported opinions, perceptions, etc. of the extent or value of a learning experience
  - Student, employer, etc. surveys
  - Exit interviews
  - Focus groups
- Direct measures are the "gold standard," but indirect measures can be powerful for providing a more holistic understanding of program effectiveness
- Balancing act between "more data is better" and time/energy costs
- Myth: "Gotta measure everyone on everything all the time" – be strategic!

ABET Criterion 3 – Student Outcomes

The program must have documented student outcomes that prepare graduates to attain the program educational objectives. Student outcomes are outcomes (a) through (k) plus any additional outcomes that may be articulated by the program.

a) an ability to apply knowledge of mathematics, science, and engineering
b) an ability to design and conduct experiments, as well as to analyze and interpret data
c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) an ability to function on multidisciplinary teams
e) an ability to identify, formulate, and solve engineering problems
f) an understanding of professional and ethical responsibility
g) an ability to communicate effectively
h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) a recognition of the need for, and an ability to engage in life-long learning
j) a knowledge of contemporary issues
k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Leave "Covert Operations" to the Intelligence Community!

Covert outcomes involve vague verbs that hide multiple and complex capacities whose assessment likely requires . . . multiple and complex measurements!

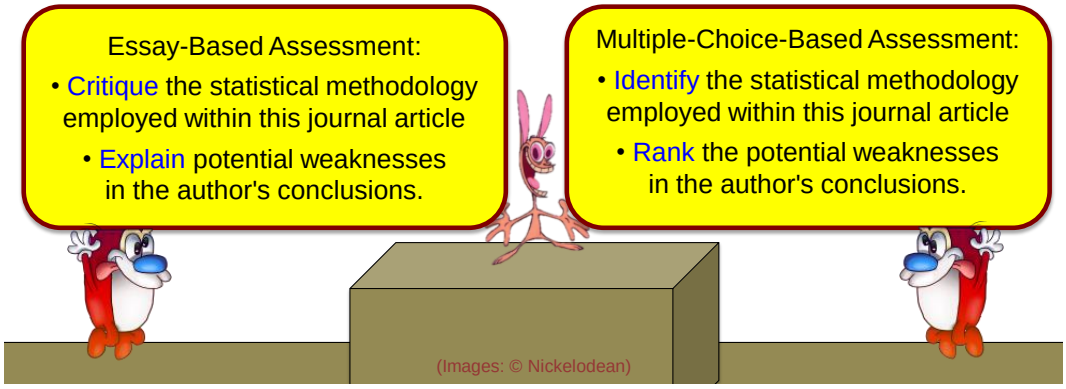
Litmus Test: Ask yourself how a given outcome could be assessed in a meaningful, actionable, and specific way

Covert and Vague	Overt and Specific (and therefore more readily assessable!)
Understand the procedure	• Apply a procedure diagram to detail user actions • Use appropriate apparatus to complete the procedure
Know the arguments	• Summarize arguments in a written outline • Identify elements that were not part of arguments
Recognize critical functions	• Select critical functions from a provided list • Match components to descriptions of their functions
Envision solutions	• Write narrative scenarios describing solutions • Design and build 3-D models to help clients envision solutions
Appreciate art	• Attend and compare two art events • Journal influence of selected art on your thoughts and feelings
Develop a social conscience	• Orally summarize social justice issues • Write an informed opinion essay

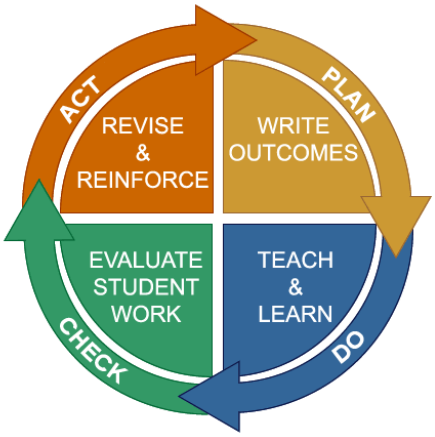
(Images: clubpenguin.com)

Start at the End: Designing Outcomes for Assessibility

- Select action verbs that *accurately communicate* what you want students to be able to do:
  - Define general conditions **or** Analyze a specific scenario?
  - Describe *or* Design an internal combustion engine?
  - State philosophical issues **or** Compare philosophical standpoints?
- In each example above, the latter verb largely *subsumes* the former verb!
- OK to tailor outcomes to the nature of your assessments . . .



Program Assessment for Continuous Improvement



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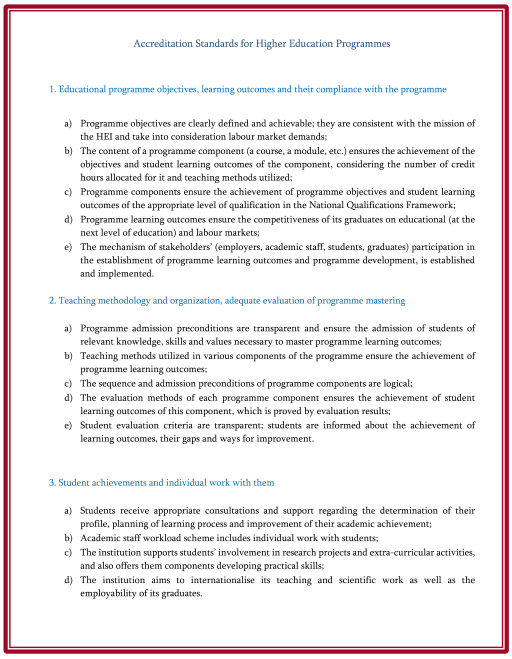

Accreditation Standards for Higher Education Programmes

1. Educational programme objectives, learning outcomes and their compliance with the programme

a) Programme objectives are clearly defined and achievable; they are consistent with the mission of the HEI and take into consideration labour market demands;
b) The content of a programme component (a course, a module, etc.) ensures the achievement of the objectives and student learning outcomes of the component, considering the number of credit hours allocated for it and teaching methods utilized;
c) Programme components ensure the achievement of programme objectives and student learning outcomes of the appropriate level of qualification in the National Qualifications Framework;
d) Programme learning outcomes ensure the competitiveness of its graduates on educational (at the next level of education) and labour markets;
e) The mechanism of stakeholders' (employers, academic staff, students, graduates) participation in the establishment of programme learning outcomes and programme development, is established and implemented.

2. Teaching methodology and organization, adequate evaluation of programme mastering

a) Programme admission preconditions are transparent and ensure the admission of students of relevant knowledge, skills and values necessary to master programme learning outcomes;
b) Teaching methods utilized in various components of the programme ensure the achievement of programme learning outcomes;
c) The sequence and admission preconditions of programme components are logical;
d) The evaluation methods of each programme component ensures the achievement of student learning outcomes of this component, which is proved by evaluation results;
e) Student evaluation criteria are transparent; students are informed about the achievement of learning outcomes, their gaps and ways for improvement.

3. Student achievements and individual work with them

a) Students receive appropriate consultations and support regarding the determination of their profile, planning of learning process and improvement of their academic achievement;
b) Academic staff workload scheme includes individual work with students;
c) The institution supports students' involvement in research projects and extra-curricular activities, and also offers them components developing practical skills;
d) The institution aims to internationalise its teaching and scientific work as well as the employability of its graduates.

5. Teaching quality enhancement opportunities: There is a publically available quality assurance system which is based on the "Plan-Do-Check-Act" cycle

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A dedicated departmental webpage for each degree that . . .

- Establishes and contextualizes DLOs for students and broader public
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- Overviews progress, priorities, and plans for program assessment
- Highlights evidence-based aspirational opportunities for philanthropy/development

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Institutional Accreditation and Program Assessment at SDSU

Stephen Schellenberg
Professor of Geological Sciences
Assistant Vice President for Educational Effectiveness
WSCUC Institutional Accreditation Liaison Officer

- Tour of regional accreditation, with focus on WASC and SDSU
- Overview of program assessment at SDSU and relation to ABET
- **Explore benefits of curricular mapping for faculty and students**

"O.K., there's the sun, so that direction is up"
(From *The New Yorker*)

Segue into Curriculum Mapping

Quote from recent university graduate:

"So you get here and they start asking you, "What do you think you want to major in?" "Have you thought about what courses you want to take?" And you get the impression that's what it's all about – courses, majors. So you take the courses. You get your card punched. You try a little this and a little that. Then comes graduation. And you wake up and you look at this bunch of courses and it hits you: They don't add up to anything. It's just a bunch of courses. It doesn't mean a thing!"

(From Willimon, W.H., and T.H. Naylor, 1995. The Abandoned Generation: Rethinking Higher Education. Wm. B. Eerdmans Publishing Co.)

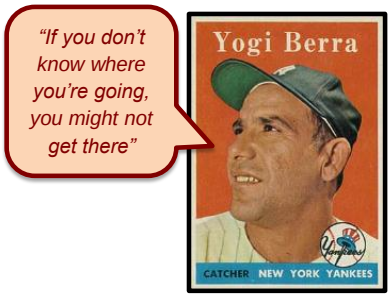
A Modest Proposal to Consider

"If we were to give students who are declaring their major not only a checklist of the courses they need to complete, but also a map that illustrates where the skills, major ideas, and concepts learned in their beginning courses (or in their general education courses) will reappear in their later courses, we would be providing clear evidence that their education does not consist of a set of disconnected courses but, rather, an integrated, connected set of skills and knowledge that is purposefully designed to prepare them for a lifetime of learning."

(From Doyle, T., 2008. Helping Students Learn in a Learner-Centered Environment: A Guide to Facilitating Learning in Higher Education. Stylus Publishing)

What is Curricular Mapping and Why Do It?

- What is it?
  - A collaborative faculty-driven, but student-centered, process that *stimulates* and *organizes* thinking about curriculum, and thereby *promotes* analysis, dialogue, and action
- Benefits to Programs:
  - Promotes faculty exploration and dialogue on relationships among courses, assignments, CLOs and degree requirements and DLOs
  - Produces a map that illuminates intentions, depicts relationships, exposes gaps and overlaps, and reveals assessment opportunities
  - Provides a framework for strategic program assessment and curricular improvements
- Benefits to Students:
  - Inspires faculty-driven actions that improve learning experience
  - Facilitates discussion of broader curriculum *within* courses
  - Produces "map" for student advising, departmental websites, recruitment materials, etc.



Q1. Which of our courses address which of our DLOs?

Curriculum Mapping with Presence-Absence Matrix

Not *this* matrix . . . Course	DLO-1. Compare…	DLO-2. Construct…	DLO-3. Interpret…	DLO-4. Model…	DLO-5. Produce…
A. HIST101 (GE Gateway)					
B. HIST204 (Major Gateway)					
C. HIST230 (Prereq: A or B)					
D. HIST320 (Prereq: C)					
E. HIST330 (Prereq: C)					
F. HIST390 (Prereq: C)					
G. HIST420 (Prereq: D/E/F)					
H. HIST440 (Prereq: D/E/F)					
I. HIST450 (Prereq: D/E/F)					
J. HIST480 (Pre/coreq: H/I)					
K. International Experience					

- Faculty are provided with course-DLO matrix via email and asked to:
  - Bold the course titles that they regularly teach
  - Place "Xs" where their courses build capacity for a given DLO
  - Return saved file to PAC by specified date

Q1. Which of our courses address which of our DLOs?
Curriculum Mapping with Presence-Absence Matrix

Course	DLO-1. Compare…	DLO-2. Construct…	DLO-3. Interpret…	DLO-4. Model…	DLO-5. Produce…
A. HIST101 (GE Gateway)	X/X/X	X/–/–	X/X/X		
B. HIST204 (Major Gateway)	X	X	X		
C. HIST230 (Prereq: A or B)	X/X/X		X/X/–		
D. HIST320 (Prereq: C)					
E. HIST330 (Prereq: C)	X				
F. HIST390 (Prereq: C)	X/–	–/X			
G. HIST420 (Prereq: D/E/F)	X				
H. HIST440 (Prereq: D/E/F)	X/X				
I. HIST450 (Prereq: D/E/F)	X			X	
J. HIST480 (Pre/coreq: H/I)	X	X		X	
K. International Experience					

- PAC provides compiled matrix to all faculty and during program meeting facilitates:
  - Overview of current *enacted* curriculum
  - Discussion of *intended/desired* curriculum
  - Identification of opportunities for a *refined* curriculum
  - Note how matrix provides structure for multiple instructors of the same course (e.g., three for HIST101) to develop some “common core” while still respecting their individual pedagogical approaches, preferred content, examples, etc.

Note: Not all DLOs need to be addressed within a given course!

Q2. How do our courses build capability for student achievement of our DLOs?
Curriculum Mapping with Progression Coding

Course	DLO-1. Compare…	DLO-2. Construct…	DLO-3. Interpret…	DLO-4. Model…	DLO-5. Produce…
A. HIST101 (GE Gateway)	I/I/I	I/–/–	I/I/I		
B. HIST204 (Major Gateway)	I	I	I		
C. HIST230 (Prereq: A or B)	IP/I/I		I/I/–		
D. HIST320 (Prereq: C)					
E. HIST330 (Prereq: C)	IP				
F. HIST390 (Prereq: C)	IP/–	–/I			
G. HIST420 (Prereq: D/E/F)	IPD/IP				
H. HIST440 (Prereq: D/E/F)	IP/IPD				
I. HIST450 (Prereq: D/E/F)	D			PD	
J. HIST480 (Pre/coreq: H/I)	D	D		D	
K. International Experience					

Think-Pair-Share: An observation and implication

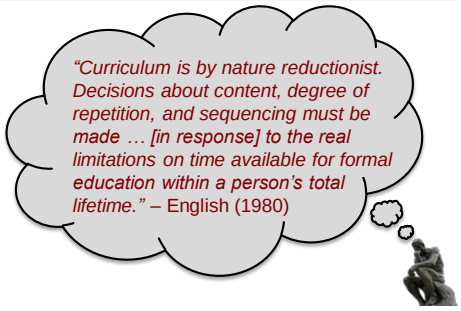
- During program meeting, faculty adopt/develop/apply a set of general terms (e.g., **I**ntroduce, **P**ractice, **D**emonstrate) conveying how a given course builds student capability towards achievement of the aligned DLO
- Process establishes the enacted curriculum, and lets discoveries of any gaps, overlaps, mirages, or miracles drive any desired refinement action
- Any desired refinement action should be captured during meeting so it can be prioritized and acted upon at some later date

Q3. Which of my CLOs align with which of our DLOs?
Going More Granular . . . Aligning at the Level of CLOs

Course	CLO	DLO-1. Compare…	DLO-2. Construct…	DLO-3. Interpret…	DLO-4. Model…
A. HIST101 (GE Gateway)	A.0.	I/I/I	I/–/–	I/I/I	
"	A.1. Describe…	I/–/I			
"	A.2. Estimate…		I/–/–		
"	A.3. Interpret…	–/I/–			
"	A.4. Analyze…		I/–/–	I/I/I	
B. HIST204 (Major Gateway)	B.0.	I	I	I	I

Note: Not all CLOs within a course need to be aligned with a DLO!

- CLO column has been added and the matrix is now expanded vertically
- HIST101 instructors have identified which of their CLOs align with each DLO
- Again, the matrix "is what it is" . . . the *process* is designed to *promote dialogue* among faculty about the intended, enacted, and (potentially) refined curriculum . . .



Q4. What opportunities exist within courses for the assessment of our DLOs?
Harvesting Low Hanging Fruit . . . Elevating Aligned Assessments

Course	CLO	DLO-1. Compare…	DLO-2. Construct…	DLO-3. Interpret…	DLO-4. Model…
A. HIST101 (GE Gateway)	A.0.	I/I/I	I/–/–	I/I/I	
"	A.1. Describe…	Essay I of Instr. A and C			
"	A.2. Estimate…		Final EQs of Instr. A		
"	A.3. Interpret…	Essay II of Instr. B			
"	A.4. Analyze…		Essay III of Instr. A	Not Currently Assessed	
B. HIST204 (Major Gateway)	B.0.	I	I	I	I

- Building upon Q3, faculty can share how they score student achievement of CLOs
- Such dialogue helps identify and elevate appropriate CLO-level course-embedded assessments in service to DLO-level assessment
- Such maps can help establish that the "glass" of assessment is likely already half-full (versus empty or half-empty!)

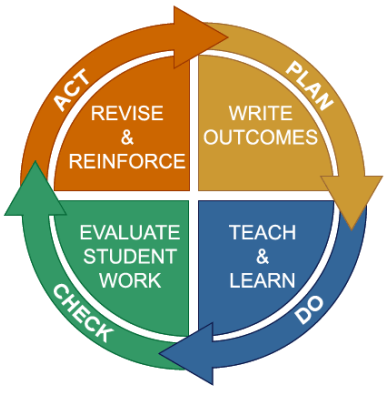
Guiding Questions for Curriculum Mapping and Beyond

- Focus on Components:
  - Are CLOs and DLOs robust and appropriate?
  - Do syllabi include CLOs? Do syllabi align CLOs with respective DLOs?
  - Do students have sufficient capability-building opportunities to achieve CLOs and DLOs?
  - What latent opportunities exists for meaningful assessment of CLOs and DLOs?

- Focus on Connections:
  - Is curriculum experienced in a logically progression with respect to course prerequisites, sequencing, complexity, and linkages?
  - What opportunities exist for students to integrate/connect CLOs/DLOs?
  - What feedback is provided regarding student development towards achieving these CLOs and DLOs?

Putting it all together . . .

- Curricular Maps as a shared vision:
  - Reflect, inform, and connect the curriculum
  - Facilitate strategic planning of "who will do what when"
- Program assessment:
  - Opportunity to document student experience and learning
  - Celebrate student achievement
  - Identify opportunities to improve student achievement
- Cyclic nature:
  - Plan, Do, Check, Act . . .
  - Periodically return to component and repeat cycle
- Fractal aspect
  - From individual CLO . . .
  - . . . to entire curriculum
-



(www.westminster.edu)

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Thank you!

If I may be of any assistance, please let me know!

saschellenberg@sdsu.edu

Student Learning Outcomes Assessment

ME351: Thermodynamics

Fall 2014

Instructor: Asfaw Beyene

Process followed to arrive at the percentage of students who met SLOs.

1. For each SLO, the assessment tool that is used to gauge whether or not the particular SLO is met is identified as indicated in the table.
2. Then a cut-off value of 70% in all assessment tools is assumed as indicative of whether or not the student has satisfied the SLO.
3. Next, the percentage of students who got a grade of 70% or more is identified for each relevant assessment tool. Subsequent to this, a simple average is taken if more than one assessment tools are used. This value is then entered as representing the % of students who have met the particular SLO.

	SLO (Student Learning Outcomes)*		**PO (Program Outcomes)****		
	1	2	1	3	5
HW 1	**X**		**X**		
Quiz 1	**X**	**X**	**X**		
Quiz 2	**X**	**X**		**X**	
HW 2		**X**	**X**	**X**	**X**
Quiz 3				**X**	**X**
HW 3			**X**		**X**
HW 4				**X**	
Midterm	**X**	**X**	**X**	**X**	**X**
Quiz 4				**X**	
HW 5				**X**	
Quiz 5			**X**	**X**	**X**
HW 6				**X**	
Quiz 7				**X**	
HW 7			**X**	**X**	**X**
HW 8				**X**	
HW 9				**X**	
Final			**X**	**X**	
% of students with >B	**38**	**25**	**35**	**55**	**39**

***Expected Student Learning Outcomes**

Upon completion of this course, the student will be able to:

SLO #1: To extend students' knowledge of concepts of thermodynamics beyond those given in ME350.

SLO #2: To enable them to apply these concepts to the analyses and design of energy conversion systems.

****Program Criteria Relevant to ME351: Thermal Systems Analysis and Design**

PO #1: An ability to apply knowledge of mathematics, science, and engineering.

PO #3: An ability to design system, component, or process to meet desired needs.

PO #5: An ability to identify, formulate, and solve engineering problems.

ME 351
Thermodynamics

Required for BSME Majors
2014-15 Catalog Data

ME 351: Basic concepts and principles of thermodynamics with emphasis on simple/pure substances; first and second law analysis, thermodynamic cycles, thermodynamic relations, gas mixtures, and chemical equilibrium.
Prerequisites: ME350, (Math 252 as prerequisites of ME350)
Co-requisites: AE340
Textbook: Cengel and Boles, *Thermodynamics: an Engineering Approach*, 7th ed., McGraw-Hill

Prerequisites by Topic:
1. Topics covered in Calculus I, II, and III, prerequisites for ME350.
2. Concepts from Static Equilibrium of rigid bodies, prerequisites for ME350.
3. Basic thermodynamic concepts covered in ME350.

Topics covered (Tentative)
1. Gas power cycles, (8 hrs)
2. Vapor power cycles, (7 hrs)
3. Refrigeration cycles, (6 hrs)
4. Generalized thermodynamic relations, (6 hrs)
5. Gas mixtures, (5 hrs)
6. Gas-vapor mixtures and air conditioning, (5 hrs)
7. Combustion, thermochemistry and chemical equilibrium, (5 hrs).

Course Outcomes
2. Ability to apply knowledge of math, science and engineering,
4. Ability to design a system, component, or process to meet desired needs,
6. Ability to identify, formulate, and solve engineering problems,
11. Knowledge of contemporary issues,
12. Ability to use techniques, skills, and modern engineering tools necessary for engineering practice,
16. Become computer literate and internet competent.

Relationship between Topics and Outcomes

TOPIC	OUTCOME NUMBER					
	2	**4**	**6**	**11**	**12**	**16**
Gas power cycles	x	x	x	x	x	x
Vapor power cycles	x	x	x	x	x	x
Refrigeration cycles	x	x	x	x	x	x
Generalized thermodynamic relations	x				x	x
Gas mixtures	x					x
Gas-vapor mixtures and air conditioning	x	x	x	x	x	x
Combustion, thermochemistry and chemical equili.	x		x		x	x

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

ME 101

PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.
PO 7: This course provided students with: An ability to communicate effectively.
PO 9: This course provided students with: A recognition of the need for an ability to engage in life-long learning.
PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practices.
SLO 1: This course met the goal of helping students develop basic to intermediate parametric, solid modeling design skills using Pro/Engineer and SolidWorks Software.
SLO 2: This course met the goal of helping students develop basic understanding of engineering documentation, dimensioning and tolerancing using Pro/Engineer and SolidWorks Software.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 102

PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.
PO 7: This course provided students with: An ability to communicate effectively.
PO 9: This course provided students with: A recognition of the need for an ability to engage in life-long learning.
PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practices.
SLO 1: This course met the goal of developing further understanding of intermediate and advanced solid modeling and drafting skills using Pro/Engineer and SolidWorks Software.
SLO 2: This course met the goal of introducing standard fits and ASME Y14.5M-1994 Geometric Tolerancing.
SLO 3: This course met the goal of introducing Finite Element Analysis (FEA) using Pro/Mechanica and CosmoWorks Software.
SLO 4: This course met the goal of developing basic understanding of NC Manufacturing using Pro/Manufacturing and Mastercam Software.
SLO 5: This course met the goal of teaching students to create a written proposal for a final project.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 296

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.
PO 7: This course provided students with: An ability to communicate effectively.
PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practices.
PO 12: This course provided students with: An ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations)to model, analyze, design, and realize physical systems, components or processes.
SLO 1: This course met the goal of developing in students basic to intermediate skills in developing compilable programs (C) and graphical programs (Lab View).
SLO 2: This course met the goal of developing in students basic understanding of computer hardware and software.
SLO 3: This course met the goal of helping students to understand the fundamental algorithms of Mechanical Engineering (linear and nonlinear equations).

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 240

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.
SLO 1: This course met the goal of exposing students to the principles which affect the properties and characteristics of materials.
SLO 2: This course met the goal of emphasizing the relationship between structure and properties.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 310

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.
PO 3: This course provided students with: An ability to design a system, component, or process to meet desired needs.
PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.
SLO 1: This course met the goal of helping students acquire an understanding of the role of design in engineering, its complexity and breadth.
SLO 2: This course met the goal of helping students to acquire a reasonable degree of skill in making decisions in an uncertain engineering situation, using scarce resources, developing a design that maximizes success while minimizing the potential and realized cost of failure.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 314

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.
PO 3: This course provided students with: An ability to design a system, component, or process to meet desired needs.
PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.
PO 7: This course provided students with: An ability to communicate effectively.
PO 9: This course provided students with: A recognition of the need for an ability to engage in life-long learning.
PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
PO 13: This course provided students with: An ability to work professionally in both thermal and mechanical systems areas.
SLO 1: This course met the goal of teaching students to apply principles of mechanics to analyze the forces and moments that act on a mechanical component.
SLO 2: This course met the goal of teaching students to apply the concepts of stress, strain, and stress-strain relations in the stress analysis of a machine element.
SLO 3: This course met the goal of teaching students to predict failure of machine elements under static loads.
SLO 4: This course met the goal of teaching students to predict fatigue failure of machine elements under time-varying, cyclic loads.
SLO 5: This course met the goal of teaching students to apply modern engineering tools (e.g. SolidWorks, Cosmos) in the analysis and communication of results.
SLO 6: This course met the goal of teaching students to prepare technical reports and homework to effectively communicate the results of the analysis and design.
SLO 7: This course met the goal of teaching students to apply the material learned under SLOs 1-5 to the analysis, selection, and design of specific mechanical elements such as shafts, fasteners, rolling element, bearings, and gears.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 330

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.
PO 2: This course provided students with: An ability to design and conduct experiments, as well as analyze and interpret data.
PO 3: This course provided students with: An ability to design a system, component, or process to meet desired needs.
PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.
PO 7: This course provided students with: An ability to communicate effectively.
PO 10: This course provided students with: A knowledge of contemporary engineering issues.
PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
SLO 1: This course met the goal of teaching students the theory and application of basic engineering experimentation.
SLO 2: This course met the goal of focusing on an industrial model for lab work where the primary purpose of experimentation is to analyze, report, and discuss results.
SLO 3: This course met the goal of conducting student experiments including mechanical vibration, PLC, Robotic, and electronic topics.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 452

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.

PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.

PO 8: This course provided students with: The broad education necessary to understand the impact of engineering solutions in a global and societal context.

PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

SLO 1: This course met the goal of teaching students to appreciate the breadth and importance of heat transfer. Qualitative analysis of heat transfer phenomena and recognition of heat transfer in every day life and real situations.

SLO 2: This course met the goal of teaching students physical and mathematical understanding of the three basic modes of heat transfer.

SLO 3: This course met the goal of teaching students calculation of steady state and transient heat transfer by conduction in various geometries.

SLO 4: This course met the goal of giving students an understanding of the boundary layer approximation for external convection heat transfer.

SLO 5: This course met the goal of helping students determine the regime of convection heat transfer and application of the proper correlations and equations.

SLO 6: This course met the goal of giving students the ability to apply heat transfer equations to mass transfer situations.

SLO 7: This course met the goal of giving students the understanding of the radiative properties of materials and the terminology used to describe those properties.

SLO 8: This course met the goal of teaching students calculation of black body properties and heat transfer radiation.

Response Key:

1: Strongly Agree

2: Agree

3: Neither Agree Nor Disagree

4: Disagree

5: Strongly Disagree

ME 490A

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.
PO 2: This course provided students with: An ability to design and conduct experiments, as well as analyze and interpret data.
PO 3: This course provided students with: An ability to design a system, component, or process to meet desired needs.
PO 4: This course provided students with: An ability to function on multi-disciplinary teams.
PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.
PO 6: This course provided students with: An understanding of professional and ethical responsibility.
PO 7: This course provided students with: An ability to communicate effectively.
PO 8: This course provided students with: The broad education necessary to understand the impact of engineering solutions in a global and societal context.
PO 9: This course provided students with: A recognition of the need for an ability to engage in life-long learning.
PO 10: This course provided students with: A knowledge of contemporary engineering issues.
PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
PO 12: This course provided students with: An ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations)to model, analyze, design, and realize physical systems, components or processes.
PO 13: This course provided students with: An ability to work professionally in both thermal and mechanical systems areas.
SLO 1: This course met the goal of teaching students to apply engineering principles and design techniques to the designing, construction, testing evaluation and optimization of an engineering system.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 495

PO 1: This course provided students with: An ability to apply knowledge of mathematics, science, and engineering.
PO 2: This course provided students with: An ability to design and conduct experiments, as well as analyze and interpret data.
PO 5: This course provided students with: An ability to identify, formulate, and solve engineering problems.
PO 6: This course provided students with: An understanding of professional and ethical responsibility.
PO 7: This course provided students with: An ability to communicate effectively.
PO 9: This course provided students with: A recognition of the need for an ability to engage in life-long learning.
PO 11: This course provided students with: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
PO 12: This course provided students with: An ability to apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations)to model, analyze, design, and realize physical systems, components or processes.
PO 13: This course provided students with: An ability to work professionally in both thermal and mechanical systems areas.
SLO 1: This course met the goal of familiarizing students with design of experiments and experimental techniques.
SLO 2: This course met the goal of introducing students to direct and indirect measurement techniques.
SLO 3: This course met the goal of training students in the techniques and theory of data acquisition and statistical analysis methodologies.
SLO 4: This course met the goal of introducing students to experimental demonstration of Brayton Cycle.
SLO 5: This course met the goal of introducing students to experimental demonstration of Rankine Cycle.
SLO 6: This course met the goal of training students in experimentally evaluating heat transfer in tubular, plate and vessel heat exchangers.
SLO 7: This course met the goal of training students in determining the heating value (HV) of fuels using a bomb calorimeter.
SLO 8: This course met the goal of introducing students to experimental procedures in determining losses in pipes.
SLO 9: This course met the goal of familiarizing students with first order and second order dynamic response of measuring systems.
SLO 10: This course met the goal of familiarizing students, through library and online research, with the scientific and engineering principles involved in each laboratory exercise.

Response Key:
1: Strongly Agree
2: Agree
3: Neither Agree Nor Disagree
4: Disagree
5: Strongly Disagree

ME 351

% of students with >B

	HW1	Q1	Q2	HW2	Q3	HW3	HW4	MT	Q4	HW5	Q5	HW6	Q6	HW7	HW 8	HW 9	Final
		78	41	11	29	82	25	44	14	19	72	14	79	22	60	58	69	10
	percent	81	43	11	30	85	26	46	15	20	75	15	82	23	63	60	72	10

students total = 96
100

		SLO (Student Learning Outcomes)*		Program Ooutcome**		
		1	2	1	3	5
HW 1	81	X		X		
Quiz 1	43	X	X	X		
Quiz 2	11	X	X		X	
HW 2	30		X	X	X	X
Quiz 3	85				X	X
HW 3	26			X		X
HW 4	46				X	
Midterm	15	X	X	X	X	X
Quiz 4	20				X	
HW 5	75				X	
Quiz 5	15			X	X	X
HW 6	82				X	
Quiz 7	23				X	
HW 7	63			X	X	X
HW 8	60				X	
HW 9	72				X	
Final	10			X	X	
% of students with >B		38	25	35	55	39

APPENDIX 4

Agenda for the ABET Symposium

April 12 - ABET Symposium: Manchester Grand Hyatt Hotel, 1 Market Pl, San Diego 92101

Thursday, April 12, 2018	
7:00am-2:00pm	Registration Open
7:00am-8:30am	Breakfast
8:30am-9:30am	Opening Plenary
9:00am-7:00pm	Self-Study Report Room Open
9:30am-10:00am	Break
10:00am-11:00am	Concurrent Breakout Sessions
11:15am-12:15am	Concurrent Breakout Sessions
12:15pm-1:30pm	Lunch
1:30pm-2:30pm	Concurrent Breakout Sessions
2:30pm-3:00pm	Break
3:00pm-4:00pm	Concurrent Breakout Sessions
4:15pm-5:00pm	Fireside Chat
5:00pm- 6:30pm	ABET Symposium Light Reception (at Grand Hyatt)

April 13

ABET Symposium: Manchester Grand Hyatt Hotel, 1 Market Pl, San Diego 92101.

Friday, April 13, 2018	
7:00am-12:00pm	Registration Open
7:30am-8:30am	Breakfast
8:30am-9:30am	Closing Plenary
9:00am-5:00pm	Self-Study Report Room Open
9:30am-10:00am	Break
10:00am-11:00am	Concurrent Breakout Session
11:15am-12:15pm	Concurrent Breakout Session
12:15pm-1:45pm	Lunch
1:45pm-2:45pm	Concurrent Breakout Sessions
2:45pm-3:15pm	Networking Break
3:15pm-4:30pm	Town Halls
6:00pm-8:00pm	Farewell Reception

April 14

- Participation in post-Symposium Workshops
- **8:30am-4:30pm** Fundamentals Program Assessment (Giga Zedania, Nino Zhvania)

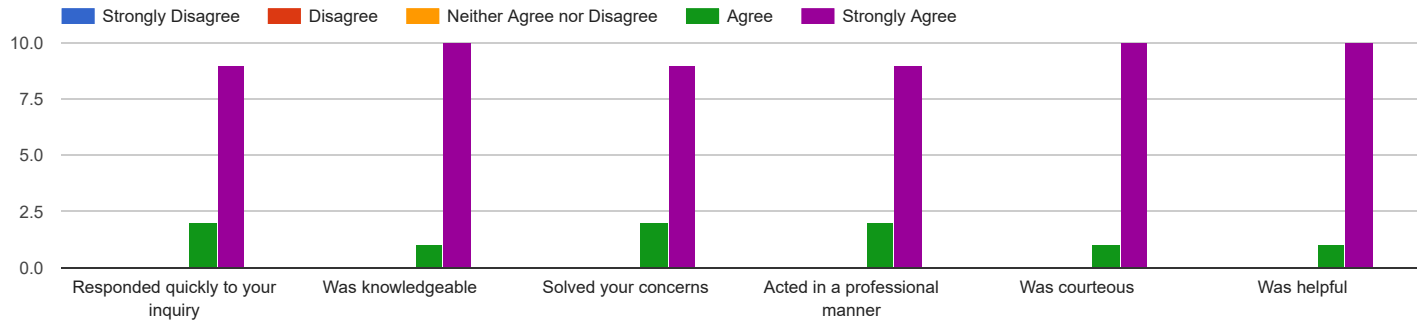
APPENDIX 5

Results of the Survey on ABET Symposium

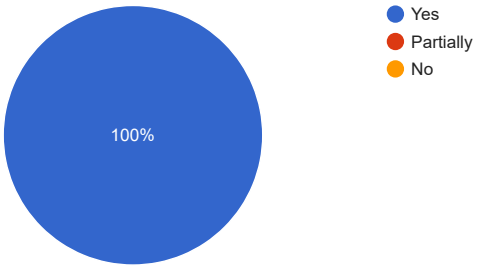
Survey
11 responses
Publish analytics
First name, Last name11 responses
Nikoloz Melkadze
Elene Zhuravliova
Nana Dikhaminjia
Giorgi Veshapidze
Giorgi Ghvedashvili
Tsisana Gavasheli
Magda Tsintsadze
Manana Khachidze
Konstantine Bziava
Alexander Bagration-Davitashvili
Nino Zhvania
Your position and the name of Partner University11 responses
ABET facilitator
Head of Quality Assurance Office of Faculty of Natural Sciences and Engineering, Ilia State University
Professor of Electrical and Computer Engineering, Ilia State University
Associate professor, Ilia State University
Professor, Ivane Javakhishvili Tbilisi State University
Assistant professor of Iv. Javakhishvili Tbilisi State University
Associate Professor, TSU
Professor, head of Computer Science department
Associate Professor
Professor
Head, Quality Assurance Office, Ilia State University

Pre-Travel Preparation

In your most recent interaction, the Representative who assisted you:

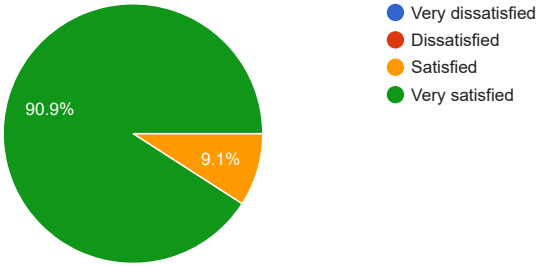


Were you well informed about the details of upcoming training at SDSU, Fundamentals Program Assessment Workshop as well as ABET Symposium?
11 responses

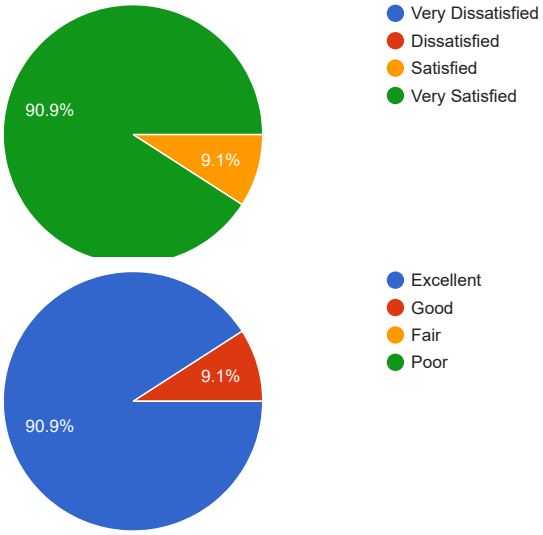


Transportation/Accommodation/Entertainment Program

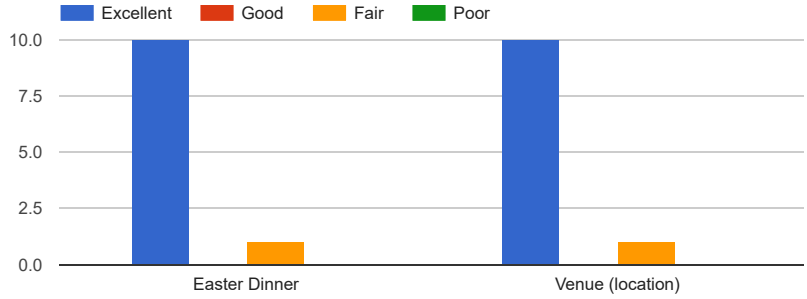
How satisfied are you in general with the shuttle service (transport company)?11 responses



How would you rate accommodation conditions provided by SDSU?11 responses

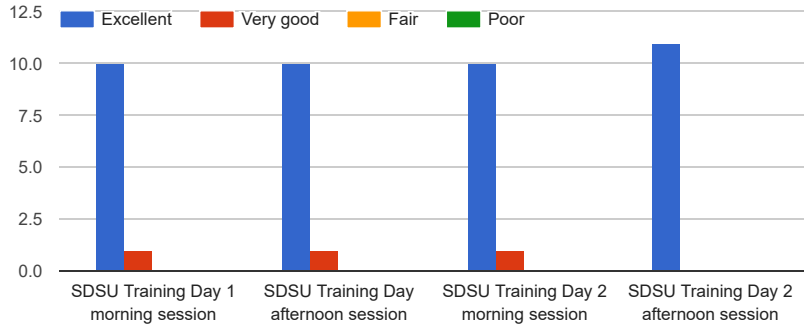


How would you rate:



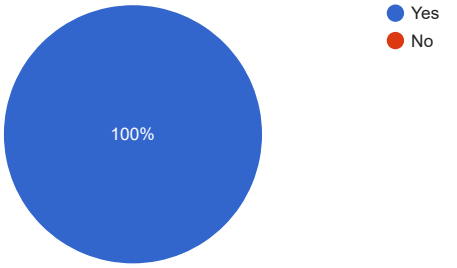
Training at San Diego State University Main Campus

How would you rate :

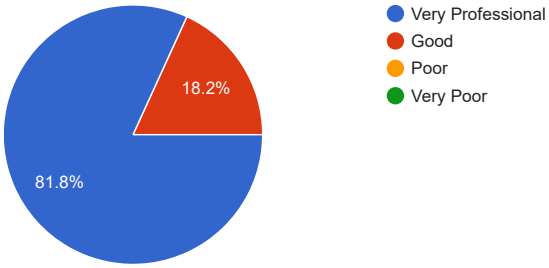


Please leave a comment regarding SDSU Training Day 1.11 responses
Very helpful
Meetings with Chairs were very informative and helpful
The most useful meeting was with the department chair, who walked us through the preparation of self-study report.
First day of training was very informative. Meeting with prof. Tummala was essential for clarifying important points regarding criteria 3 and 4.
Was very informative and helpful
Will usefull
Was informative
It was useful
Very helpfull and needfull
Very good
Very through focus on the specifics of ABET accreditation.
Please leave a comment regarding SDSU Training Day 2.11 responses
Very informative
Meeting with WASC representative and tour were very interesting
Presentation of WASC accreditation and facility tour was very interesting and informative.
Presentation of WASC representative was very inspiring. Also the lab tour and the attendance to industrial meeting was very interesting.
Was very productive
Was indormative
Was useful especially advisory board meeting
it was informative

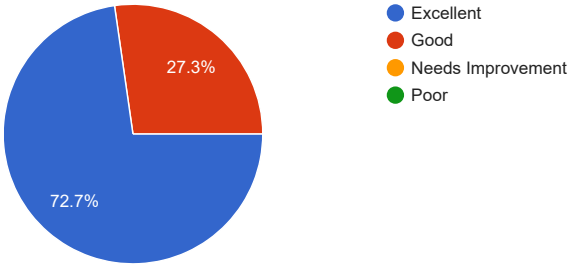
Very helpfull
Very good
Outstanding presentation on WASP
Were your trainers able to answer all your questions during the training?11 responses



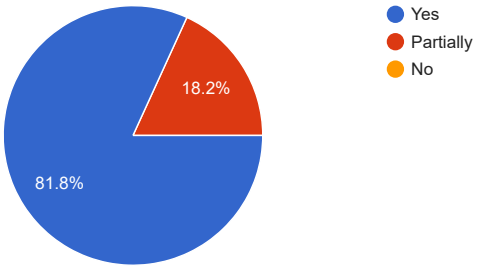
How would you rate the overall Training?11 responses



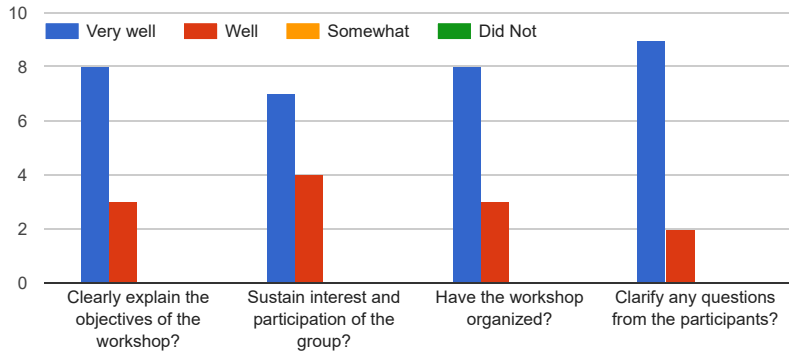
Fundamentals Program Assessment Workshop (FPAW)
How would you rate the Workshop?11 responses



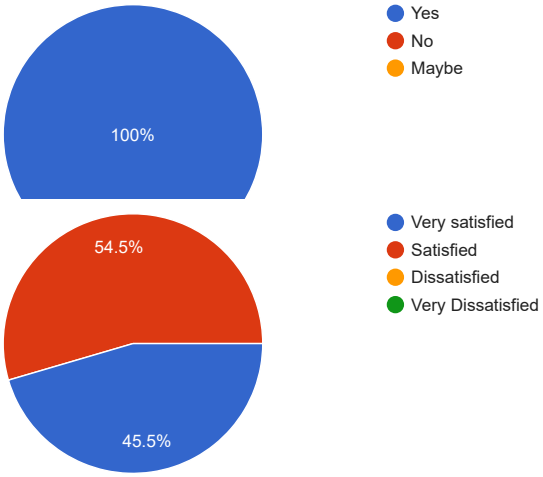
Were your expectations towards FPAW fulfilled?11 responses



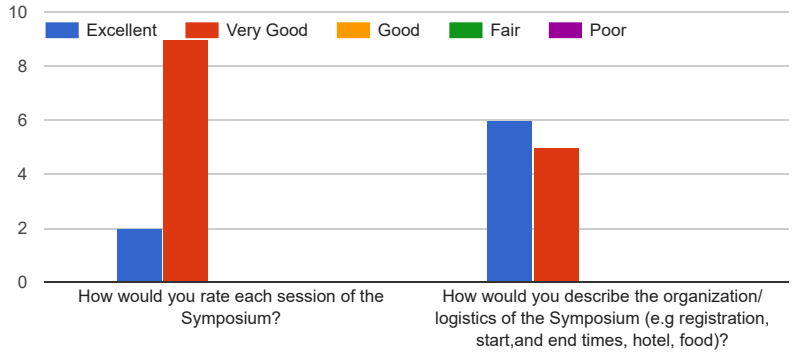
Did the facilitator(s)...



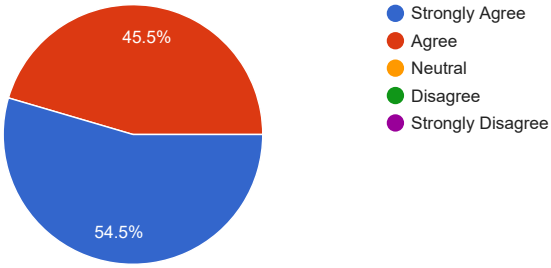
Do you think you will be able to use the skills acquired at this training in the future?11 responses



Please record your opinion regarding the following:



The material presented was informative and understandable. 11 responses



We hope you had a great experience, and we are eager to hear your comments and feedback.11 responses
Fruitful
Thank you for very useful training and your hospitality
The whole experience was very useful for our future ABET accreditation plans.
I did indeed have a great experience. Thank you for making this possible
I wish to go to ABET symposium in future as well as in SDSU
Was very important
It was a great experience, thank you!
It was a good experience thank you
Thanks a lot for this great opportunity and for the excellent organization of our business trip!!!
I have obtained a great experience
I consider this experience as a very important contribution to my professional development.

.

Appendix 6.

ABET Foundation Second Visit Report

Not included here